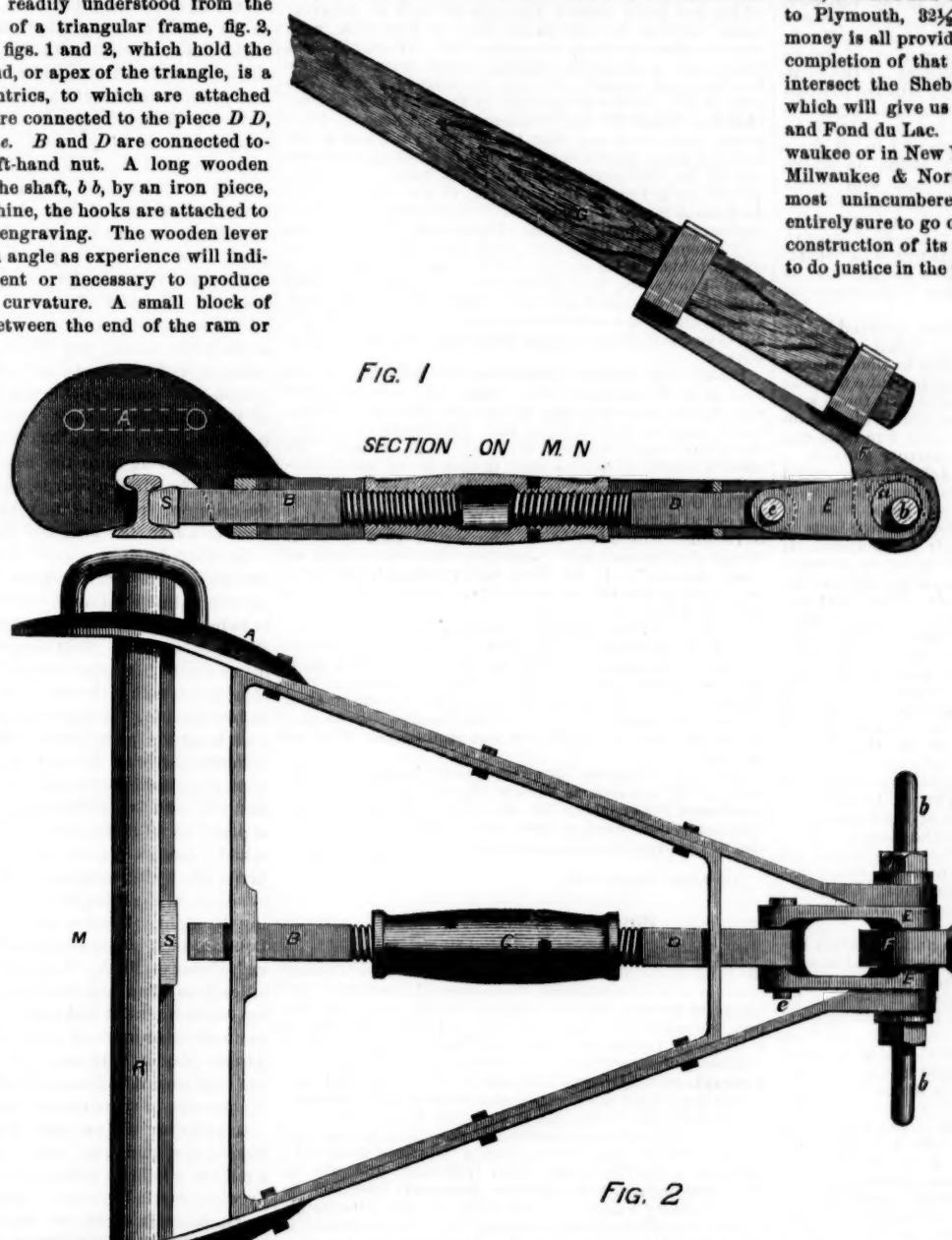
RAILROAD GAZETTE

SATURDAY, AUGUST 19, 1871.

EMERSON'S RAIL-BENDING MACHINE.

This machine is the invention of Mr. George D. Emerson, of No. 13 East Thirty-third street, New York, and is intended to curve or straighten railroad bars. Its construction will be readily understood from the engraving. It consists of a triangular frame, fig. 2, with heavy hooks, *A A*, figs. 1 and 2, which hold the rail. At the opposite end, or apex of the triangle, is a shaft, *b b*, with two eccentrics, to which are attached the links *E E*. These are connected to the piece *D D*, figs. 1 and 2, by the pin *e*. *B* and *D* are connected together by a right and left-hand nut. A long wooden lever, *G*, is attached to the shaft, *b b*, by an iron piece, *F*. To operate the machine, the hooks are attached to the rail as shown in the engraving. The wooden lever is then raised at such an angle as experience will indicate is the most convenient or necessary to produce the required amount of curvature. A small block of iron, *S*, is then placed between the end of the ram or die, *B*, and the web of the rail. The right and left-hand nut is then turned so as to bring the ram into hard contact while the lever is in position. The lever is then pressed down as far as is necessary to give the rail the requisite curve. The weight of one man at the end of the lever is sufficient to bend any rail laterally.



This machine is very portable, as it weighs only 185 pounds, and measures between extreme points about 3 by 4 feet. The lever is attached to the iron piece, *F*, by simply inserting it into the eye pieces, *N*. It is, consequently, more convenient to handle the machine, as it can be moved by two men, than to move a rail, and, therefore, in rectifying irregularities upon a track already laid, it is not necessary to take up the rail, but only to draw the few spikes which would be moved by the action of the machine.

In shaping rails for curves, they should be bent at regular intervals, commencing at one-half the interval from the end. For example, to adapt a 24-feet rail to a 4-degree curve, it should be bent at four points, viz.: 3, 9, 19 and 21 feet from one end. Now if the distance from the center of the rail to a line stretched from end to end is .61 inches, and at the two points half-way between the center and ends .45 inches, the curvature is right; but if the ordinates are too great or too small, the rail can be bent more or less with the machine as may be required. A rail for a 10-degree curve will require to be bent at six points at proper intervals.

The machine is especially useful in forming very sharp curves, as for sidings, street curves, and for turntables; and also for street rails when the use of a hammer is liable to break the rail.

To bend a rail vertically as it stands upon the track, *i. e.*, to take out "bumps," or raise drooped ends, it is necessary to take up the rail and turn it upon its side.

This machine is now in use on the New York Central, Hudson River, and Harlem, and other roads, and

all the iron—several miles in the aggregate—for the new Forty-second Street Depot was bent with one of them.

For further information, address M. N. Forney, No. 72 Broadway, New York.

The Milwaukee & Northern Railway.

To the Editor of the Railroad Gazette:

My attention has been called to a paragraph in the Railroad Gazette of August 5, 1871, page 216, which is plainly injurious to the Milwaukee & Northern Railway Company in its tenor and effect. I know you must have been misled in some way, or you would not have admitted an item so untrue and so damaging. The paragraph states that "propositions to subscribe aid "for an extension of the Milwaukee & Northern Rail-"way northward from its present terminus at Cedar-"burg, have been voted down in all the towns from "Cedarburg to Plymouth," which is untrue, as several towns on that part of the line have voted liberal amounts of aid. Your item clearly conveys the entirely erroneous idea that most of the localities that we rely upon have denied us the aid we ask.

Here are a few facts: The first division of the main line of the Milwaukee & Northern Railway extends from Milwaukee through to Cedarburg, Plymouth, Clinton and De Pere to Green Bay. I enclose herewith, for your better information, a sectional map of the State of Wisconsin. The road in question is already completed and in full operation to Cedarburg, twenty miles from Milwaukee, and is free from any debt or incumbrance except a first-mortgage on such completed part for $14,000 per mile. The length of the line to be built from Cedarburg to Green Bay is about 88 miles, through as fine a country as the sun shines on, which is already well improved and ready to afford a large business to the road.

Aid has already been voted to promote the building from Cedarburg to Green Bay as follows, to wit:

City of Milwaukee	$65,000
Town of Sherman	12,000
Town of Lyndon	15,000
Town of Plymouth	25,000
Town of Russell	5,000
Town of Schleswig	15,000
Town of New Holstein	30,000
Town of Chilton	25,000
Town of Charlestown	20,000
County of Brown	100,000
Making	$310,000

And more promised. The prospects of the Milwaukee & Northern Railway Company were never before so fair as they are now. We have just concluded a contract with Messrs. D. L. Wells & Co. (responsible men) to build and complete our road from Cedarburg to Plymouth, 32½ miles, by December next. The money is all provided, and the iron purchased for the completion of that part of the road. At Plymouth we intersect the Sheboygan & Fond du Lac Railroad, which will give us connections with both Sheboygan and Fond du Lac. A very little inquiry either in Milwaukee or in New York will enable you to see that the Milwaukee & Northern Railway Company is in a most unincumbered and prosperous condition, and entirely sure to go on speedily and successfully with the construction of its road. We do not doubt your desire to do justice in the premises by giving publicity to the above facts, which will correct, in some measure, the very erroneous impression which the paragraph referred to must have produced. Some one must have misinformed you—I hope not intentionally.

O. H. Waldo,
President of the Milwaukee & Northern Railway Company.

[The paragraph to which Mr. Waldo refers, or the substance of it, was copied from an exchange. The error was detected before publication, and directions were given to leave out the paragraph, which it seems was not done. The road seems to us a very prosperous one having a large territory and a productive one entirely to itself, and we regret to have done an injury, or even an apparent one, to the project. —Editor Railroad Gazette.]

Cheap Railways.

The Narrow-Gauge and the "Railroad Gazette."

The N. Y. *World* of the 8th inst. republished an editorial on narrow-gauge railroads from the Railroad Gazette, of July 8. In the *World* of the 9th inst. the following letter is published under the above head:

To the Editor of the World:

Sir: The friends of cheap railways are deeply indebted to you, not only for the space you have given to those who favor such lines, but to those who oppose them or who deny the correctness of the facts published in respect to their character and results. But for your desire to ventilate the question, I and your readers generally would never have seen the article you this morning copy from the Cincinnati *Railroad Gazette*, which attempts to show "the fallacy" of those who advocate the so called narrow-gauge lines. I propose to examine the line of argument taken up by this writer, and show that he has not met the case fairly on its merits, either as a question of ascertained fact or of science.

In the first paragraph he sets up a man of straw, somewhere out West, and then proceeds to knock him down. He has discovered a veritable Don Quixote, "a writer in one of the leading Western papers," who asserts "that the cost of building and equipping railroads was in proportion to the cube of their gauges, according to which a road of three-feet gauge would cost three and two-thirds times as much as one of two feet," and so on. Having found an adversary, he straightway levels his lance and rushes at him with true Quixotic ferocity, but only to find that he has attacked a windmill. I propose to show that the writer in the *Railroad Gazette* either "does not understand the subject he is writing about," or purposely evades the true and genuine issues. Neither he nor the opponent he has selected has ever had the opportunity of traveling on

or seeing a narrow-gauge line, or they would be able to write more understandingly on the subject. The popular maxim that "seeing is believing," however, cannot always be appealed to, inasmuch as we are compelled to accept the most vital truths on the testimony of others.

Let us now proceed to state exactly what is claimed for the new narrow gauge, and see on what evidence the facts are based. In a letter from Mr. Fairlie, the father of the new narrow-gauge system of constructing and operating such lines, which appeared in the *World* of August 2, he states the latest trials made on the Russian narrow-gauge line opened in Russia. I have now before me a printed document giving the results of that trial.

This line is known as the Imperial Livny Railway. It is fifty-seven versts, about thirty-nine miles in length. It is vouched for by Count Alexis Bobimskoy, President of the Russian Railway Department of Public Works, and by Professor Saloff, President of the company, and a number of high State and railroad officials and engineers, that one of Fairlie's double-bogie engines, weighing twenty tons, drew a freight train of the gross weight of of 345 tons up a grade of 1 in 80 for a distance of seven versts, or about five miles, on which there were several reverse curves of from four to six chains; that of this 345 tons 254 were paying, and only ninety-one non-paying loads; that the actual cost of the work and plant were 60 per cent. of the cost of Russian railways of the five-foot gauge. This test was considerably in excess of the contract of Mr. Fairlie, who is now Chief Engineer of the Russian Department of Narrow-Gauge Railways.

Now, I am not one of those writers referred to by the Railroad Gazette as *assuming* "that the dead weight of rolling-stock is in proportion to the distance between the rails" I assume nothing, and take nothing for granted. I quote facts, and require that those who argue against them shall either rebut the evidence on which they rest, or show that the broad-g uge lines can compete, and in what way, with the narrow gauges.

I have already, in the *World* of July 24, contrasted the results of the European narrow-gauge lines with the New York Central. It would only be a waste of time and of your valuable space to repeat these facts in detail, unless so nebody denies their correctness. If the writer in the Railroad Gazette wishes to promote the public service and add to his scientific reputation, let him revise his theories on the basis of the latest and most authentic facts with which I have supplied him. Let him also supply himself with the carefully compiled reports of the commissions of eminent experts, appointed by three or four European governments and the governments of India and Queenland, who had a number of experiments made in their presence on the narrow-gauge lines of Wales. If the conclusions of these commissioners were right, then the Gazette is wrong in its assertions about "the fallacies" of those who are seeking to introduce cheap railways into this country. I have before me late copies of London *Engineering*, the London *Engineer*—two of the highest scientific authoriti s in the world—and the London *Railway News*, all containing lengthy articles sustaining all that Mr. Fairlie and his f iends and disciples claim for the Russian and other narrow-gauge lines. Until we can have equal experience in this country we must necessarily rely on that of Europe.

As a science, railway construction and operation belong to that class known as "experimental sciences," and as the questions at issue have been brought to the test of practical experiment in Europe, it seems to be folly to argue on the data supplied by the old gauges, except for the purpose of making contrasts. Nor are we bound to accept as argument, what might be done by improved rolling stock on the broad gauges. What we have to do with is wha' is doing on the best of them.

I showed, in an article in the *World* of the 24th July, that the actual freight hauled in 1869 on the New York Central, one mile, amounted to 410,000,0 0 tons, and that it required an equal amount of rolling stock or dead-weight to do the work. As some errors inadvertently crept into the figures contrasting the results of the narrow gauge lines of Europe with the Central, and as I had not then received the account of the Russian trials, I ask permission to state what the results would have been on the Central with a 3-feet 6-inch track and Fairlie rolling stock—taking the Russian tests as the basis of the calculation. These tests showed that 91 tons of rolling stock hauled 254 tons of paying load up heavier gradients than any on the Central line. The 91 tons does not include the weight of the engine, say 19 tons, which raises the total to 110 tons dead weight. If the dead weight requir d to haul 254 tons is 110 tons, what will be required to haul 410 million tons? Answer—One hundred and seventy-eight millions, s ving 232 millions. The Russian narrow gauge is 3 feet 6 inches. In the article of July 24 three feet was made the basis of calculation. The dead weight was set down at 153 millions for that width. If we add one sixth for the additional breadth of the Russian gauge, it would make the dead weight 178½ millions, showing that the ratio of increase is in proportion to the ratio in the breadth of the gauge.

I shall not enter into the question as to how much improvement might be made in broad-gauge rolling stock, nor can I permit our opponents to raise that question. We narrow-gauge people simply accept things as we find them. When the broad-gauge advocates have invented better rolling stock we shall be prepared to deal with the facts then as we are now.

The Railroad Gazette instances the performances of "the Fort Wayne division of the Pennsylvania Railroad" as a fair example of a "well-managed" line, and shows that the dead weight hauled "is only 1.49 to 1" of paying load, and goes on to say that "the Chicago, Burlington & Quincy shows the same, and the Cleveland & Pittsburgh only 1.08 to 1." The Gazette will see that our New York Central has conceded to it by the narrow-gauge writers a still better result—due probably to the bett r gradients of that line. Now, let the Gazette break a lance against our armor of steel, if he dare. Let him, if he dispute our facts, address a letter to Count Bobimskoy and Professor Saloff, and inquire whether the published statements made in their name are true. If "Mr. Fairlie's paper of last fall has been quoted till it is threadbare" it will be refreshing to have some new sensation given to the world through the columns of the Gazette, in the shape of a communication direct from the President of the Imperial Railway Department of Russia and the distinguished professor. In the year referred to, the New York Central carried 206,000,000 passengers one mile, and in doing so it took 306,000,000 tons of rolling stock to perform the work, or one and one-half tons per passenger. The Ohio *Statesman*, describing the passenger cars of the Denver & Rio Grande three-foot gauge line which had lately passed through *en route* to Denver, says, "they are finished in the most modern style, with water-coolers, saloons, etc., complete. They will seat thirty-four passengers, making a dead weight of only four hundred pounds to each passenger. * * * The cost of the narrow-gauge car is about $3,000, against $5,000 to $6,000 for the broad-gauge." The same paragraph goes on to say that the Denver narrow-gauge railroad costs $12,000 a mile—that is about one-half the cost of four-feet eight-and-a-half-inch lines. The facts quoted are given on the authority of the builders, the Jackson & Sharp Company, of Wilmington, Del. Does the Gazette question them? It does not, but in a weak way attempts to show that such cars cannot be very comfortable, that a six-foot man cannot stand up in them at the sides, though they are seven and a half feet high at the crown of the arch. Shall we receive such arguments from a writer who, it is obvious enough, did not take the trouble to visit and inspect them for himself?

I shall make but one point more on the sneering attack of the Gazette on the claims set up on practical data by the narrow-gauge advocates, and then await—not anxiously, but calmly and confidently—the first American experience on such railways, which will shortly dispel all doubts and delusions of mere theoretical writers.

The Gazette says Mr Fairlie states the weight of his car at 3,668 lbs., and "that it will carry 11,200 lbs. of freight," which is 1 to 3. The writer then goes on to say that he does not "question the correctness of these figures." If he does not question the figures, why does he not set to work and design a car for his favorite 4-feet 8½-inch gauge that will do as well? "The proof of the pudding is in the eating," and we invite him to prepare a pudding for his broad-gauge friends. Meantime, he may satisfy himself by a summer voyage to Russia, if he prefers that to the correspondence suggested, that the diminished weight of a narrow, as compared with a broad-gauge car is not wholly or even mainly due to the diminished length of the axle.

I will not trespass longer on your colums or the patience of readers, as I learn that a highly scientific gentleman is preparing for the *World* an article that will set at rest many of the crude and exploded theories of the broad-gauge advocates.

H. B. W.

New York, August 8, 1871.

Pittsburgh Railroad Bonds.

The Pittsburgh *Commercial* announces that the last of the judgments obtained in the United States Circuit Court in the suits brought to recover the accrued interest on the six per cent. railroad bonds issu d by the city, were satisfied on August 1, and that the city of Pittsburgh, for the first time in fifteen years, is now clear of judgment liens. After the construction of the Pennsylvania Railroad, the people of the city of Pittsburgh demanded more rapid and more direct communication with the West, and, in order to further the project, the corporation subscribed for stock to the amount of $200,000 in the Pennsylvania & Ohio Railroad; $150,000 in the Chartiers Valley Railroad; $500,000 in the Pittsburgh & Connellsville Railroad; $400,000 in the Alleghany Valley, and $500,000 in the Pittsburgh & Steubenville Railroad—making in all a subscription of $1,800,000 to railroad stock. The bonds of the city of Pittsburgh, bearing interest at six per cent., were issued in payment of the railroad stock. A few years after the subscriptions were made financial disasters swept over the cou try, and railroad stocks, particularly those in which Pittsburgh had invested, declined in value and paid no dividends. The city, which had relied upon these dividends to pay the interest on the bonds, failed to meet her obligations. Suit was therefore brought, judgment for the amount due was obtained, and the railroad stocks were levied upon. The city of Pittsburgh, instead of entering into proper arrangements, permitted the stocks to be sold at a sacrifice, and a large part of these securities only brought ten cents on the dollar. The city then had incurred a debt of $1,800,000 with interest, and had no property to represent this large sum. Subsequently, however, the city proposed a compromise to her creditors by which the 6 per cent. railroad bonds were exchanged for 4 per cent. bonds, having fifty years to run. The greater part of the bonds were exchanged upon these terms, but some of the creditors refused to accept the terms proposed, and brought suit to recover the interest on the old bonds. The judgments in these cases, amounting to over $500,000, have just been paid in currency. A few years ago an attempt was made to recover for the city the railroad stock that had been sold at a sacrifice under the execution. A bill in equity was filed, and the holders of stock agreed to exchange their securities for 6 per cent. bonds of the city of Pittsburgh. Under this arrangement a profit of $127,000 accrued to the city, and this sum has been employed in establishing a sinking fund.

—W. G. Peck has been appointed Superintendent of the new Vineland Railroad.

Contributions.

ON RAILROAD SIGNALS AND SWITCHES.

It is becoming an important matter to know how to carry the greatest possible number of trains on a double track with safety and economy. The world's great centers of busy life and industry are throwing yearly an increasing business on the great main iron arteries which connect them with minor cities and surrounding districts. How to make some railroads carry double and treble what it was originally estimated they would have to carry has been a question thrust home to the minds of many intelligent railroad men, and not without a successful solution. Instead of building a third or a fourth track, which would have involved an outlay incommensurate with the work to be done, they have solved the problem in another manner, and thus have increased very considerably the capacity of the iron track and locomotive combined.

This result has been attained by the elaboration of a complete system of semaphore and electric signals. What eyes are to a human being, signals are to a railroad. Let these be imperfectly or wrongly used, and the result is hesitation, uncertainty of action, and disaster. The city of London to-day, from the nature of the conditions to be complied with, and the enormous traffic ebbing and flowing from it, has taxed the energies and brains of railroad managers to produce a system that would enable them to operate the traffic of of these roads with safety and economy. Some suburban lines carry 400 to 600 trains per day, and main roads radiating into the heart of the country carry from one hundred upwards, comprising trains of every description, from the fast express at fifty miles per hour down to the long and ponderous coal train.

At every depot a signal post from thirty to sixty feet high is erected, carrying two semaphore arms at the top painted red on the side from which the signal is to be observed, one arm being applied for each track. When extended at right angles to the post, just as a man extends his arm straight out from the shoulder, this indicates that the train must be brought to a stand before reaching the signal, and no engine-driver dare pass it, under penalty of a fine or dismissal. When lowered half-way down, to an angle of forty-five degrees, this indicates caution; and when let down so that the arm is hidden within the post, the road is signaled as all clear, and the train may proceed at full speed. Lamps placed upon the post which show red, green or white, corresponding to the three above positions of the semaphore arms, serve as signals during the night. In most cases, in the neighborhood of London, such lamps are lighted with gas and show a very intense light. Standing at a point about two miles from Clapham Junction, where some eight or ten roads intersect and radiate in different dir ctions, some thirty or more of these signal lamps may be seen fiercely blazing with the red or danger lights, which are only turn d to green or white momentarily to allow the passage of some passing train or trains.

In addition to the main signal post at the depot, what are called auxiliary posts are placed from half a mile to a mile on either side of it. These are worked by wires carried into the signal box of the man who works the main signal, are often of great height, and can be seenfor two miles before reaching the depot, so that should switching be going on of any kind, the main track can be blocked to prevent fast trains running into stray wagons or freight trains.

Still further, however, on the heaviest worked roads, to insure punctuality and safety, what is known as the "block system" is introduced. To illustrate this, let us take the first eighty-two and a half miles outward of the London & Northwestern Railway—that is, from its London terminus, Euston, to Rugby. This company owns 1,500 miles of double track, much of it laid with steel rails, eighty-four pounds to the yard, has expended $270,000,000 on its road, owns 1,800 locomotives, turns out from its own machine shops a new locomotive every third or fourth day, manufactures its own Bessemer steel, and rolls its own rails. Its earnings are about $750,000 per week, or say $500 per mile per week. It can easily be imagined that its main stem is very heavily crowded with trains. Some twenty-five or more run over this eighty-two and a half miles, without stopping, in one hour and fifty-five minutes or two hours. The whole number of trains is over one hundred, including every variety. The "block system" is in force along the whole line, in addition to the semaphore signals at every depot. Every three miles is placed a signal box or hut, at which is stationed a signalman provided with red, green and white lamps and flags. A single telegraph wire communicates from box to box.

Each box contains two instruments, one for each track connected with the incoming and outgoing wire, and each instrument is possessed of two keys. Pressing down one key of the outgoing or forward wire brings opposite a slot, both of its own and of its immediate neighboring instrument ahead, a piece of pasteboard, on which is printed in red letters, "line blocked," and pressing down the other key of the same instrument brings opposite another slot in its own and the same contiguous instrument a slip of pasteboard with black letters on white ground showing "line clear." The same arrangements hold good for the wire leading in the opposite direction.

Suppose, therefore, a train to pass *A* going toward *B*. After giving the proper signal with the flag or lamp to the engine-driver, according to whether it is day or night, *A* puts his finger on a key of the instrument whose wire leads to *B*, and immediately his own and *B*'s dial read "line blocked." This intimates to *B* that a train is traveling towards him, between his own and *A*'s box. *A* has no power to release the signal on his dial; only *B* can do that, and his instructions are not to do so until the train has passed him. Immediately this is the case, he puts his finger on the key and his own and *A*'s dial read "line clear." Until he gets this signal, *A* would would not allow another train to pass him going towards *B*. In this way a space of three miles is preserved between all trains, whatever their character or speed. As the line is well fenced and no level crossings exist, all common roads being carried either under or over the railroad by bridges, the effect is to give the engine-drivers entire confidence. When a man gets an all-right signal at any box it indicates to him that the road is clear for three miles ahead, and all he has to do is to look for signals. Such indications are as valuable to him as the friendly light-house is to the storm-tossed mariner.

Incidentally, it may here be remarked that the plan of keeping a certain definite distance between all trains on crowded lines is the only safe one. An interval of time allowed to one train before allowing another to depart is not an absolute guarantee of safety. Such a train may break down or come to a stand on its journey, and then, if it be on a curve or steep gradient or there is a fog, or the rails are greasy from the effects of a shower, the second train may collide with the first before it can be brought to a stand. Whereas, where a space of two or three miles is preserved between all trains, it is next to impossible that a collision can occur from one train overtaking another.

Another feature in the system is that of the "breakdown wire," as it is called. This is the bottom wire of the telegraph (there being one for each track), which is brought down within about five feet of the ground on about every fifth post, and up again, so as to preserve the circuit; but which, if broken, instantly shows on two instruments, one at the depot on either side, that such is the case. In the event of a breakdown to any train, the conductor instantly runs, therefore, to the nearest post where the wire is brought down within reach, and with a pair of nippers which he always has at hand, breaks it in two. This being instantly notified by the instruments at the depots on either side, the necessary help can very quickly be supplied.

Another ingenious device is that for knowing when lamps placed on distant signal posts, out of sight of the signalman become accidentally extinguished. Within the lamp is placed a piece of metal, which by its expansion caused by the heat of the flame brings its ends in contact with an electric wire. The circuit is then complete, and a current of electricity flows through it. In the signalman's box, on a table, is placed a miniature semaphore post with arms. By proper mechanism, operated upon by the same current of electricity as that which flows through the distant signal lamp, and which is carried by a wire connecting the two, the arm is kept down parallel with or within the post so long as the lamp is alight. As soon as the lamp goes out, however, the piece of metal contracts, contact is broken, the current ceases to flow, and the little arm flies out at right angles to the post and rings a bell. The signalman sees at a glance what is the matter, and goes or sends immediately to re-light his lamp.

Space prevents a very minute and detailed description of this beautiful system, which adds so much to the safety, security and economy of railroad working. Enough, however, has been written to give a general outline of it, and it is much to be desired that the same plan, or some modification of it, may speedily be adopted in this country. When the great bridge and tunnel and Union Depot are completed at St. Louis, it will be absolutely necessary for the operating of the vast traffic that will center there, that a most complete system of signals of some kind be adopted, and no one can doubt that electricity will be the chief agent employed in the working of these.

Another matter deserving of more attention than has heretofore been given to it, is that of switches. The turning of these by isolated men, who run backwards and forwards from one to another, is neither safe nor economical. Many lamentable accidents have occurred through the wrong turning of a switch, more especially at depots which express trains pass without stopping. It has not unfrequently happened that the turnout has been left open instead of the main track, and the result has been death and destruction wholesale. The safest and most economical plan is that now largely adopted on English railroads—that of placing all switch levers at any depot under the care of a properly trained signalman, by placing them in a signal box, and giving to each turnout at that depot its own distinct semaphore arm and lamp.

The arrangement is as follows: Suppose the depot to be a junction or a terminal one; then at some point nearest to where the greatest number of switches may converge, a sort of gallery is erected right over the main track, high enough for all trains to pass underneath it and with glass sides both back and front, so that a good view is obtained up and down the track, as well as all over the depot ground. Inside this, in a long iron rack, a row of switch levers—that is, one for each switch—is placed, and each lever is duly labelled with a number on a brass plate corresponding to the number of the switch, which, possibly, may be a quarter of a mile distant. By means of bell cranks and iron rods, each lever is connected with its own switch. Above the roof of the gallery posts are erected which carry semaphore arms and lamps, one arm and its corresponding lamp far each switch. The switch lever works the signal arm or lamp, and the mechanism is so constructed that the arm will not fall from its normal position of danger, or the lamp change from red to green or white, until the switch is properly set to enter the turnout and locked in that position; at the same time, and by the same movement, the arm or lamp for the main track is also locked to a position indicating danger or stop, and cannot possibly be moved until the switch has been reversed to a position of safety for the main track, and its arm or lamp placed to indicate that the turnout is closed. No difficulty is found in communicating from the conductor of a train or an engine driver to the signalman as to which turnout he wishes to enter. A certain number of soundings of the whistle, a waving of a hand lamp or flag, enables them to do this, and whilst a freight or other train may be shifting or sorting its various cars from point to point, the eye of the signalman in his box is ever up and down the main track, to keep it locked until he sees it all clear for an advancing train.

By this system there is a saving of labor, as well as a sense of security engendered amongst the employees, and it is an approach to what is so much to be desired on railroads as elsewhere—the substitution of self-acting mechanism for the varied kinds of human labor at present so absolutely necessary. J. B. R.

August 8, 1871.

Locating Bridge Piers.

Evansville, Ind., August 10, 1871.

To the Editor of the Railroad Gazette:

The "Inquirer" for locating bridge piers, in your paper of August 5, page 211, will probably find an interest in the method by which I located the piers of the Illinois & St. Louis Bridge, at St. Louis, Mo.

I first located on one side of the river a base line about 1,600 feet long with intermediate points from about 400 to 700 feet, so that each point could be seen from another one by putting on a pencil or another small object.

Measuring this line twice, we did not allow more then about two thousandths of a foot difference between two points. The intersection point of the base line and center line of the bridge must be known and marked exactly.

If now the distance from the intersection point to any pier, and the angle between base line and center line of the bridge is known, the angles on each marked point of the base line to any point of a pier can be calculated. Locating now on two points of the base line the calculated angles with a good theodolite, and marking each by flags, it is not difficult to find the crossing point on the river and to drive there a pile.

This point of course, must be correctly marked after the pile is driven.

To get the axis of a pier, I marked two points, one at a certain distance above and one below the pier.

The instrument must be a very good one, the verniers divided to ten seconds.

Any other information will be given with the greatest pleasure.

Chas. Meyer, Civil Engineer.
Evansville Division, St Louis & Southeastern Railway.

Leavenworth's Railroad Prospects.

On the 18th inst. we left Leavenworth in company with Mayor Halderman and Mr. Edgerton, on a visit to the railroad men of Chicago. We went to see, hear and learn all we could of our railroad interests and prospects.

We called at the office of the Chicago & Southwestern Railway Company, and talked with President Winston, Vice-President Burnes, Secretary Aller, Mr. M. H. Courtright, director and builder of the road; Mr. Seymour, Engineer; Mr. Cook, Vice-President, and Mr. Riddle, Superintendent of the Chicago & Rock Island Railroad.

They informed us that they would not accept the proposition made by the county in its present shape, but if it was so amended as to include the right of way through the city they would probably accept and build the road.

We visited the American Bridge Company's shops, and found the work progressing on the first span of the bridge. Much of the work was done, and the Superintendent assured us the first span would be completed and delivered at the bridge on or about the first day of September next, and the balance of the work would be completed by the middle of December, so that the bridge could be finished for the passage of trains by the first day of January, 1872.

The officers of the Chicago & Southwestern Railway Company assured us that all the bonds for the amount required to build the bridge had been negotiated and the proceeds of the same was on deposit in New York. There can, then, be no possible doubt of the completion of the work by the time named. Mr. Courtright, contractor for the building of the Chicago & Southwestern, assured us that the road would be finished to Leavenworth by the 15th of August next, and that through trains would be running from Chicago to Leavenworth by the first of September next.

We had a long, agreeable and candid conversation with Hon. J. M. Walker, President of the Chicago, Burlington & Quincy, and also President of the Leavenworth, Lawrence & Galveston Railroad, and also the successor of Jas. F. Joy in the management of the lines of roads west of Chicago known as the Joy roads.

Mr. Walker told us that the bridge over the Kansas River at Lawrence would be finished within ninety days, and that he was now negotiating with the Kansas Pacific Company for the running of through trains over the entire length of his road from Southern Kansas to Leavenworth.

We learned from reliable sources that the Joy and Walker interests intend at the close of the present year to let the Hannibal & St. Joseph Railroad go into other hands; at any rate, they do not intend to make it part of their main line from the State of Kansas to Chicago, but they intend to concentrate the travel upon the Missouri Valley—now the Kansas City, St. Joseph & Council Bluffs Railroad—carrying passengers to St. Joseph, and thence over the new line of road which they are building from St. Joseph to Burlington. It is claimed that this is a shorter route, and one of much easier grade, than the old Hannibal & St. Joseph. If this be true, and we do not doubt it, it will be to the interest of the Leavenworth, Lawrence & Galveston Railroad Company to send all the Chicago passengers and freight on their road *via* Lawrence, Leavenworth and St. Joseph. It will readily be understood that this is an additional reason for favoring the sale of the Leavenworth Branch of the Kansas Pacific road to Walker.

The building of a bridge at Atchinson is not yet definitely determined upon. Senator Pomeroy and others have gone to Boston on that business Whether they agree upon the building of it now or not will be determined in a few days. We regard the bridging of the Missouri at Atchinson as certain within the next three years.

The Chicago & Southwestern will build a branch of their road to Atchison within the next twelve months.

The project of extending the Missouri, Kansas & Texas road, from some point on that road near Burlington *via* Lawrence to Leavenworth, seemed to meet with favor.

There was but one opinion expressed about the propriety of extending the Carbondale road from Lawrence to Leavenworth. It is a fact well understood that all business from the Topeka & Santa Fe road could reach Chicago *via* Lawrence and Leavenworth, twenty-five miles nearer than by Atchison, and that over an almost level grade.

The narrow gauge was discussed, those interested in the Chicago & Southwestern road favoring its construction for the reason that it will be a feeder to their road. Those interested in the broad-gauge lines generally opposed the narrow gauge, but all their arguments only increased our faith in the policy that the inauguration of a line of narrow-gange roads concentrating at Leavenworth was the policy that would prove of more value to Leavenworth than any other one project that has been offered to us.—*Leavenworth Times, July.*

—There is now in operation at Jauriet's office a telegraphic instrument under the charge of Mr. Charles Foss. The object of this instrument is to keep a time card of approaching trains, that their arrival may be predicted in Aurora, where the men on the trains and engines are changed. By the judicious use of this, the men need not be called at night earlier than necessary to take their stations. Should a particular train be belated two or three hours, there is no necessity of calling the men, but they can be left to sleep. Hence, when called, they are fresher and can give better attention to their duties.—*Aurora (Ill.) Beacon.*

RAILROAD GAZETTE

PUBLISHED EVERY SATURDAY.

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Editorial Announcements.

Correspondence.—*We cordially invite the co-operation of the Railroad Public in affording us the material for a thorough and worthy Railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.*

Inventions.—*Those who wish to make their inventions known to railroad men can have them fully described in the* RAILROAD GAZETTE, *if not previously published,* FREE OF CHARGE. *They are invited to send us drawings or models and specifications. When engravings are necessary, the inventor is expected to furnish his own engravings, or to pay for them.*

Articles.—*We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.*

Engineering and Mechanics.—*Mr. M N. Forney, Mechanical Engineer, whose office is at Room 7, No. 73 Broadway, New York, has been engaged as Associate Editor of this journal in charge of these departments. He is also authorized to act as our agent.*

☞ *Our Prospectus and Business Notices will be found on the last page.*

CHEAP RAILROADS.

In another column we reprint from the New York *World* a letter on this subject, which is intended to be a reply to an editorial on narrow-gauge railroads which the same paper copied from the RAILROAD GAZETTE of July 8. (The *World* and its correspondent will allow us to correct them, by calling attention to the fact that the GAZETTE is not published in Cincinnati, as they state, but in New York and Chicago.) The writer of this letter criticises our article rather severely, and adopts a line of reasoning which we think is fallacious, so that we feel called upon to reply to what he has written.

His argument, stated in a few words, is this: A railroad with a 3-feet 6-inch gauge has been built in Russia which has cost one-third less than the most cheaply constructed 5-feet gauge roads in that country. The inference he draws therefrom is, that therefore a narrow-gauge railroad can be built cheaper than *any* road with a wide gauge, a deduction which the facts do not at all justify, because the Russian 5-feet roads may, and probably did, cost more than cheap roads should. As the writer "assumes nothing, and takes nothing for granted," we cannot allow him to assume what is really a leading question, viz.: that the railroads in ordinary use in Russia, or elsewhere, are built as cheaply as it is possible *they might be.* That is exactly the point we deny, and we have been arguing to prove that such roads can be built much more cheaply than they usually have been, and that by adopting light rolling stock their cost would be very little more than of narrow-gauge roads.

The other argument used by the correspondent of the *World* is, that on the New York Central as much dead as paying weight is hauled over the road during a year, whereas, on the Russian narrow-gauge road *one train* carried 2.8 times its weight of freight—therefore, he concludes, that as the gross weight on the former road is less than on the latter, consequently the narrow-gauge line can be operated more cheaply than the other.

It will be observed that he counts all the empty and partially loaded cars hauled on the New York Central, whereas, on the other road he takes only one train, the cars in which are all loaded to their full capacity. It is certainly somewhat remarkable that a person who "takes nothing for granted" should "*assume*" that no empty or partially loaded cars are ever hauled over narrow-gauge roads. In order to make a fair and accurate comparison of this kind, the number of miles run by the cars on each road in a given time, their weight, and the number of tons of freight hauled one mile must be known. Only a very few railroad companies in this country keep an account of the freight-car mileage, and the weights of trains published in the State Engineer's report are generally only more or less shrewd guesses at the fact by the officers of the road, as any one can easily convince himself by looking over the report and seeing that they are nearly always given in even figures, a result which would not occur if they were deduced from carefully compiled statistics. We have no knowledge of any accurate record of the car mileage on narrow-gauge roads; and of wide-gauge roads such information can only be procured from the reports of a few companies, among which are the Pittsburgh, Fort Wayne & Chicago, Cleveland & Pittsburgh, Chicago, Burlington & Quincy and Central of New Jersey.

We therefore distrust very much the accuracy of the figures given by "H. B. W.," and think that the error injures his own argument, as we believe that the proportion of dead weight of cars to that of paying freight carried on the New York Central is more than 1 to 1. If not, it is most extraordinarily good working. In this connection we must beg narrow-gauge writers to be more accurate in their statements of facts. Mr. Schuyler, Secretary of the Denver & Rio Grande Railway Company, says, in a circular published with his signature, that "statistics show that the proportion of dead to paying weight is as 4 to 1." Now either Mr. Schuyler or "H. B. W.," or both, must be very far astray.

We do not say that the proportion of dead to paying weight carried on narrow-gauge roads is not less than on our lines with their present working. What we have shown is, that the comparisons made by the *World's* correspondent are unfair, and, therefore, valueless. But if it was shown—and it probably could be, though not to the extent that "H. B. W." has stated—that less dead weight is hauled on the Imperial Livny Railroad than on the New York Central, it would only show that the latter road carries more dead weight than a cheap road should. Now we will certainly not be guilty of the folly of saying that a road to do a light traffic at a slow speed cannot be built more cheaply and be operated with cars of less weight than one to do a heavy traffic at high speed. If "H. B. W." conceives that to be the question at issue, he can spare himself all further discussion. We say, only, that the difference in the amount of dead weight hauled on the Russian narrow-gauge road and on the New York Central is not nearly so great as he represents; and, next, that the difference is due not to the gauge, but to other causes; and, lastly, that the means used for reducing the weight of trains and cost of construction of narrow-guage roads are just as available with a 4-feet 8½-inch guage as with one of 3-feet; and, finally, that cheap wide-gauge roads have been built, and are now in operation, and that it is folly to introduce a new gauge with all the attending inconveniences for the very slight difference in cost due to that cause.

The reasoning of nearly all the advocates of the narrow-gauge roads is, that cars for such roads will carry from two to three times their weight of freight, whereas the cars ordinarily used on 4-feet 8½-inch-gauge roads will carry very little more than their own weight of freight; consequently, that the gross amount of weight hauled to transport any given amount of freight will be considerably less on the one road than the other; and, therefore, it is said lighter engines can be used, and the working expenses be considerably reduced. Now without denying or admitting these facts, what the RAILROAD GAZETTE article undertook to show was, that the reduction in weight of cars was not due to the gauge, but to entirely different causes; and that if the same kinds of cars were built for a wide-gauge as are used on the narrow, their weight, when loaded, would not be more than one per cent. greater for the one road than for the other. To this "H. B. W." has no word of reply, excepting to deny the fact, and to say that "I cannot permit our opponents to "raise that question." He has been proclaiming to the world that cheap railroads can be built for much less if made of a narrow gauge than if the rails are placed far apart, because the carrying capacity of the narrow-gauge cars, in proportion to their weight, is much greater than that of wide-gauge cars. Now when it is shown that it is not the gauge to which this reduction of weight is attributable, but the kind of cars used, and that the same advantages which are claimed for the narrow gauge would result if similar cars were used on the wide, he says, "he shall not enter into that question." In other words, he and other advocates of the narrow gauge say that they can accomplish certain things by building narrow-gauge roads. In reply, we say we can do just as well on a wide gauge as you do on the narrow, if we employ the same means. His answer to this is, that "narrow-gauge people simply accept things as they find them." Surely this is a most extraordinary position for a person who is urging so sweeping a change as the introduction of a new gauge and rolling stock for railroads. It is very like a child who "won't play" when the result of the game don't suit it.

He also says that "when the broad-gauge advocates "have invented better rolling stock we shall be pre-"pared to deal with the facts," and makes a somewhat cynical suggestion that the editor of the RAILROAD GAZETTE should design a car for a 4-feet 8½-inch-gauge road. If he had read that paper he would have found that a car was designed—or perhaps more accurately—*adapted* for the wide gauge, and that the paper referred to contained an engraving of it. The only recommendation he—the editor—felt justified in making for it, however, was, that it is as good as those proposed for narrow-gauge roads.

Considering that this question of the weight of cars in proportion to their carrying capacity is the one vital one on which all the arguments in favor of a narrow gauge rest, it is, perhaps, not surprising that he is unwilling "to enter into it." Narrow-gauge people seldom are. It is the one which they have been, and still are, afraid to meet fairly. We find it quite impossible to get any properly authenticated figures of the weight of narrow-gauge freight cars built in this country. We have applied to the builders of such cars and of narrow-gauge railroads, and although large contracts have been given for the construction of them, and some have been completed and shipped, the parties interested are still unwilling to make their weight public.

What the advocates of such roads seem to lose sight of is, that the weight of a car depends more upon its plan than on the gauge.

An open platform car will weigh more than one which affords protection from the weather, and one without trucks less than one with them. An eight-wheeled *platform* car will weigh from 12,000 to 15,000 pounds and will carry 20,000 pounds, whereas an eight-wheeled *box* car weighs from 18,000 to 20,000 pounds and will carry no more than the other. A *four*-wheeled coal car for an ordinary road will carry double its weight of coal, whereas an *eight*-wheeled coal car, with double trucks, will carry only about 1½ times its weight.

The statement, therefore, that a train of cars which weighed only 91 tons carried 254 tons of paying freight, is valueless so far as giving any idea of the carrying capacity of narrow-gauge rolling stock is concerned, unless we know something more about the cars which made up the train. It will not be at all difficult, if we are allowed to select the cars, to make up a train on almost any road in the country which would weigh 91 tons and carry 254. The statement regarding the performance of this Russian train, therefore, proves nothing, excepting just what appears on its face. "H. B. W." says he takes nothing for granted and quotes facts only. Will he be a little more specific about them? "If," as we have taken occasion to remark before, "freight is carried on four-wheeled platform cars on the 3-feet 6-inch-gauge Russian line, and on eight-wheeled double-truck or bogie cars on the wide gauge, then the difference in dead weight is due, in part at least, not to the gauge but to the plan of car."

What the narrow-gauge people should do, if they want to make a fair comparison, and what none whose writings we have seen have yet done, is to compare the weight of four wheeled platform cars for the narrow-gauge with the same kind for the wide; four-wheeled box cars with four-wheeled box cars; double-bogie cars with similar cars for the other gauge. We will take, for example, the weights of narrow-gauge cars given in the circular of M. Baird & Co., proprietors of the Baldwin Locomotive Works, and which are perhaps the most accurate that have yet been published on this side of the Atlantic. They are as follows:

	Wgt. of car	*Capacity.*
Narrow-gauge four-wheeled box car	4,500 lbs.	8,000 lbs.
" " platform car	3,500 "	9,000 "
" " coal car	4,000 "	8,500 "

We are unable to say whether these are the actual or only the estimated weights of cars, but in either case it would not be difficult to find the same kind of cars, on almost any 4-feet 8½-inch-gauge road where such are used, which will carry fully as much in proportion to their weight as is stated above. There are coal cars on nearly all our coal roads which carry more than double their weight of coal. It is difficult to give data in relation to the other kinds, because so few are in use.

With reference to passenger cars, we are fortunately able, through the kindness of the proprietors of the Jackson & Sharp Manufacturing Company, of Wilmington, Del., who are building the passenger cars for the Denver & Rio Grande 3-feet-gauge road, to give their weight. They seat 34 passengers, and weigh 15,000 pounds, or 441 pounds *per passenger*. The seats are 18 inches wide for each person, and are placed 30 inches apart, measuring from the center of one seat to the center of that behind it.

On the New Jersey Railroad there are cars in daily use between New York and Philadelphia which weigh 26,100 pounds, and seat 56 passengers. The seats are 33 inches apart and 19½ wide. If they were placed as near together as in the narrow-gauge cars, 60 passengers could be seated, and the weight would then be only 435 *pounds per passenger*. Taking "H. B. W.'s" figures —$3,000 for the narrow gauge car and $5,000 for the wide —and comparing the cost per passenger of these cars, we have $88 for the narrow gauge and $83 for the wide, so that the advantage for the narrow gauge is not apparent in either the *weight or cost*. It must also be remembered that the seats of the New Jersey car are wider, and that it is at least a foot higher than the other.

On the Elevated Railroad, in New York—4-feet 10-inch gauge—there are double-truck cars which weigh 5,700 pounds, and seat 22 passengers, being 259 pounds per passenger. In these, however, the seats are arranged longitudinally.

Even on the much-abused 6-feet gauge, we find Erie cars which weigh 33,150 pounds and seat 63 passengers. The seats are 23 inches wide for each person, and if placed as near together as in the narrow-gauge car, 67 passengers could be seated, and the weight would be 495 *pounds for each one*. These latter cars are very wide, and two feet higher than those for the Denver & Rio Grande road, so that if their size were reduced to the proportions of the narrow gauge, their weight per passenger would probably be very little if any more than that of cars for the 3-feet gauge.

We are not foolish enough to say that cars which must run at a high speed are not heavier than those which run slower. The speed has much more to do with their weight than the gauge. If, on a narrow-gauge road, the speed is very slow, the cars may of course be lighter than for a broad gauge where they run much faster; so that in comparing the weight of broad and narrow-gauge cars, the speed at which they are intended to run should be the same in each case. We do not know whether the narrow-gauge advocates claim that they can run *slower* on their roads than on a broad gauge, or whether they will "permit their opponents" to do so, but what we do know is, that the same kinds of cars of equal strength and carrying capacity, and to run at the same speed, will not weigh materially more for a 4-feet 8½-inch-gauge than for one of only 3-feet, and it is this alone which determines the amount of dead weight hauled. The management of the traffic and the size of cars are independent of the gauge, although sometimes confused with it. The whole argument in favor of the narrow gauge, therefore, rests upon this question of the reduction of the weight of cars, and it is the one which "H. B. W." is least willing to meet.

Let him produce the cars, or show reason why they weigh so much less to carry a given quantity of freight on one gauge than they do on the other. We will admit that if the cars for a narrow gauge will carry 2-8 times more freight than the same kind of cars of equal weight will on the wide gauge at the same speed, that his case is proved; but we say that they have proved nothing by showing that *some kinds* of cars carry more on the narrow gauge than *others* do on the wide. The columns of the RAILROAD GAZETTE are open at any time to publish engravings of cars which have this wonderful carrying capacity on a 3-feet gauge and lose it if adapted to one of 4 feet 8½ inches. Can "H. B. W." furnish us with the drawings for the benefit of our readers and the public generally?

His plea that he "quotes facts," and will hear nothing else, is, in effect, an admission that he is unable to answer arguments. He says in effect that roads can be built with a narrow gauge whose first cost and operating expenses will be much less than if made of a wide gauge. We say that a wide-gauge road can be built which will cost very little more than his narrow-gauge, and have told him how it can be done. It is, of course, a very convenient way of disposing of inconvenient reasoning to say, "we are not bound to accept as argument what might be done by improved rolling stock on the broad gauges." In a discussion of this kind, if he intends to be fair, he is bound to accept what *can* be done, when the way to do it is shown conclusively. Besides, does he think the use of four-wheeled cars is an invention which has been put into practical operation for the first time on narrow-gauge roads? or that carrying freight—which should be protected from the weather—on platform cars—where it is not so protected—has been evolved out of the inner consciousness of narrow-gauge apostles and prophets? We have shown that his statements of facts are unsound, and his comparisons unfair, and if it is "experimental" science he wants, we have given the experience of others. The contemptuous assertion that these are "the doubts and delusions of mere theoretical writers" he will find will not satisfy the public, nor will an absurd challenge "to try a lance against his armor of steel" blind their eyes to the facts at issue.

Regarding the cost and other data concerning the narrow-gauge cars, we cheerfully accept the authority of the builders; but we must decline accepting as entirely trustworthy a casual newspaper paragraph statement of the cost of the Denver & Rio Grande Railway. There is no question about the fact that roads equipped with heavy rolling stock and laid with rails to correspond, will cost more than lines having only a light superstructure and equipment. As we have stated before with reference to this question, it quite naturally resolves itself back to that of the weight of cars, a point about which we have already written enough, excepting that we should like to inquire of "H. B. W." upon what the diminished weight of narrow-gauge cars is "mainly due"? This is the point to which the article in the RAILROAD GAZETTE, which he has criticised so fiercely, was chiefly addressed, and it was there shown that the only difference in the weight of the same four-wheeled car intended for a narrow gauge if adapted to a wide one was that due to the length of axles, which "H. B. W." denies, offering no word of reason for the faith that is in him, but excusing himself with the announcement that "a highly scientific gentleman is preparing for the *World* an article that will set at rest many of the crude and exploded theories of the broad-gauge advocates." We await our demolition—"not anxiously, but calmly and confidently."

One word more. As "H. B. W." "requires" facts, will he please refer to the article on "Light Railways," copied from *The Engineer*, and reprinted in the RAILROAD GAZETTE of August 12. He will there find a description of a cheap wide-gauge railroad; and as he is given to "accepting things as he finds them," we trust that he will find this road is not one of "the delusions of the mere theoretical writer," and that he will "revise his theories on the basis of the latest and most "authentic facts," with which the RALROAD GAZETTE will always be ready to supply him.

The Chicago & Northwestern Report.

We give elsewhere a pretty complete summary of the annual report of the President of this company, which seems to us one of the most interesting documents of the kind lately published. During the year, from time to time, statements of earnings and expenses were made which showed a large increase of net earnings in the face of a considerable decrease of gross receipts. The report now published shows just how and where the great savings in operating were made. The saving of nearly $1,700,000 in operating expenses, in itself sufficient for a dividend of 4½ per cent. on all the capital stock, is a feat in railroad management which has rarely been equaled and will be likely to give the President a reputation as one of the most skillful and determined of railroad managers. Certainly it is only by an intimate knowledge of the details of railroad operation coupled with rare administrative abilities and a determined will that such a result could have been attained.

The most discouraging feature of the year's work is the decrease in receipts. Last year, when the decrease was $1,400,000, it was hoped and believed that the bottom was reached and that it would at least be a good year to compare with; but now we see a further decrease of $840,000, making the earnings of the last year $2,245,000 less than those of the year ending May 31, 1869, and less than they have been since 1866-67, when the Iowa Division was still incomplete, and the mileage of the road 120 miles less than last year. The decrease for 1869-70 was due in large part to the falling off in receipts for carrying supplies for the Union Pacific Railroad, which amounted to more than a million the previous year. Last year there was a still further decrease in Omaha business, the through passenger business between Chicago and Omaha being less by nearly $300,000, but the remaining decrease in passenger earnings—$166,000—was pretty equally distributed on the different divisions and the different stations, and is charged to a general depression of business. The decrease in freight earnings is $487,000, caused by a falling off in grain shipments, the total freight tonnage having actually increased a little, but consisting, to an unusual extent, of material for new railroans and carried at very low prices.

The St. Paul & Chicago Railroad.

The laying of track on this road, from St. Paul to Winona, 110 miles, was completed last Wednesday. Before cars can run through by this line bridges must be completed at Hastings and at Winona. The road is on the east side of the Mississippi, from St. Paul to Hastings, and thence to Winona on the west side. At Winona its only eastern outlet is the La Crosse, Tempealeau & Prescott Railroad, controlled by the Chicago & Northwestern Company, which, however, depends upon the La Crosse line of the Milwaukee & St. Paul Railway for an outlet. It was expected some time ago that the Chicago & Northwestern would control this line, and operate it in connection with the La Crosse & Winona line and its new line from Madison to La Crosse, as a part of a through line between Chicago and St. Paul, of which the Winona & St. Peter road would be a feeder. It is understood now, however, that the Milwaukee & St. Paul Company has obtained control of the St. Paul & Chicago Railroad, and that it will make it a part of its main line to St. Paul, and that the Northwestern will have to depend upon the West Wisconsin for a connection with that city. This, however, will compel the Milwaukee & St. Paul Company to make a new line between Winona and La Crosse. It obtained a charter for such a line along the west bank of the Mississippi last winter, but, we believe, has taken no steps towards its construction as yet.

In connection with the Milwaukee & St. Paul and the La Crosse, Trempealeau & Prescott roads, this will form a line between Milwaukee and St. Paul only 331 miles long, or 75 miles shorter than the present route by Prairie du Chien. From Chicago by way of the Northwestern and the Baraboo Air Line the distance to St. Paul by this road would be about 70 miles further. The Northwestern line by the West Wisconsin will be eight miles shorter, or 393 miles long. The Northwestern, perhaps, might be willing to exchange the use of the 28 miles of its road between La Crosse Junction and Winona, and the six miles north of Winona, to the St. Paul Junction, for the use of the 40 miles of the Milwaukee & St. Paul's road between Tomah and La Crosse Junction, which would let it into La Crosse and give it an opportunity to connect with its Winona & St. Peter road without the necessity of constructing forty miles or more of road over a very difficult and comparatively unproductive country. But this question is complicated with others which cannot easily be settled.

The Master Mechanics' Association.

The following circular has been issued by the Secretary of the Master Mechanics' Association to members:

CHICAGO, August 1, 1871.

DEAR SIR: The American Railway Master Mechanics' Association will convene for their fourth annual session at Louisville on Tuesday, the 12th day of September next, and the increasing interest manifested in the Association's progress gives assurance that this meeting will prove no less successful than those that have preceded it.

The committee have selected the Galt House as the Association headquarters, and have arranged ample accommodations for all members at a liberal reduction from regular rates. As the sessions of the convention will be held in rooms provided at this hotel, it will be most convenient for members to have rooms there also.

It is earnestly hoped that your official duties will not prevent your attendance at this meeting.

If you purpose being accompanied by ladies, please notify me, and rooms will be reserved for you. Respectfully, yours,

L. P. DODGE, Sec'y.

MISCELLANEOUS.

—The following is a list of new steamers building for the Pacific Steam Navigation Company, in Glasgow and Liverpool:

Names.	*Tonnage.*	*Horse-power.*
Lusitania	3,500	1,200
Garonne	3,500	1,200
Chimborazo	3,500	1,200
Cuzco	3,500	1,200
Aconcagua	3,500	1,200
Santiago	2,000	800
Ilo	2,000	600
Trajilio	2 000	800
Eten	2,000	600
Colombia	2,000	600
Tacna	2,000	600
Iquique	800	200
Taboguilla	300	100

Another, not named, of 300 tons and 100 horse-power, will be ready on December 31st, 1871.

—Dr. Wm. G. Breck has recovered $10,000 damages from the Connecticut River Railroad Company for injuries received by a collision at Northampton, in June, 1870. The Doctor brought suit for $40,000.

—Since July 1 the Little Miami Railroad has issued monthly commutation tickets to suburban residents, entitling the holder to a specific number of rides, provided the ticket would only be used during the month. On August 2 General Tom Powell presented his July

ticket containing a number of rides unused, and declining to pay an additional fare was put off from two different trains that he boarded. He has sued the company for $20,000 and the conductors for assault and battery.

—The following table shows the proportion of the different classes of travelers, and the receipts from them on the leading British railroads:

	Percentage of Numbers.			Percentage of Receipts.		
	1st Class.	2d Class	3d Class.	1st Class.	2d Class.	3d Class.
Chatham ..	8	14	78	25	20	55
Brighton ..	10	18	72	30	28	42
S. Eastern.	12	18	70	33	24	43
S. Devon..	7	30	63	18	34	48
Cornwall ..	6	32	62	15	37	48
S. Western	19	48	33	32	40	28
N. London	15	32	53	18	34	48
Bris & Ex.	13	64	23	25	50	25
Gt. Eastern	14	38	48	22	34	44
Gt. Western	8	30	62	27	38	35
N. Western	10	32	58	30	35	35
G.Northern	8	44	48	28	38	34
N. British..	14	12	74	25	20	55
Lan & York	8	20	72	18	29	53
Midland ..	6	24	70	20	37	43
Caledonian	12	6	82	26	14	60
N. Eastern	6	23	71	18	31	51
M. S. & L.	5	10	85	14	26	60
Taff Vale..	3	5	92	6	10	84
Av'age per-centage..	9½	26½	64	22.631	30 473	46-894

The large proportion of second and third-class passengers is very striking in this country, where doubtless 95 per cent travel as first-class passengers, and where, on most roads, only one class of cars is provided.

—The Illinois Canal Commissioners announce, through D. C. Jenne, Chief Engineer, that navigation will be interrupted at Henry after the 20th inst. until the completion of the lock and dam at that place for the improvement of the Illinois River, which will be about the 1st of November.

CHICAGO & NORTHWESTERN RAILWAY.

Annual Report for the Year Ending May 31, 1871.

The Chicago & Northwestern Railway Company operates a line from Chicago to Milwaukee, 85 miles; one from Chicago to Fort Howard, Wis., 242.2 miles; one from Kenosha to Rockford, 72.4 miles; one from Chicago to the Mississippi, opposite Clinton, Iowa, 137 miles; one from Turner Junction, 30 miles west of Chicago, on the last named line, to Freeport, Ill., 91 miles; a branch of the above from Elgin north to Richmond, Ill., 33 miles; another branch of the same from Belvidere, Ill., northward to Madison, Wis., 67.6 miles; a line across the northern peninsula of Michigan from Escanaba, at the foot of Green Bay, northward to Lake Angeline, near Lake Superior, with short branches to mines, 73.8 miles, and a line from Clinton, Iowa, westward across Iowa to Council Bluffs, 354 miles. The last named line is leased, the rest owned by the Chicago & Northwestern Company.

This gives a total of 1,156 miles of railroad operated by the company during the past fiscal year. Besides, it owns a controlling interest in the Winona & St. Peter Railroad, 146 miles, the La Crosse, Trempealeau & Prescott Railroad, 28 miles, and has a permanent lease of the Iowa Midland Railroad, 35 miles, but the operations of these roads are reported separately.

Since the close of the last year reported, the company has completed 20 miles of an extension of its Madison Division and 10 miles of an extension of the Elgin & Richmond Branch from Richmond, Ill., to Geneva, Wis.

We give below an abstract of the President's report:

THE GROSS EARNINGS.

From Passengers,		$3,333,111 03
" Freight,		7,700,808 79
" Express,		237,812 28
" Mails,		189,585 36
" Miscellaneous,		233,596 98
		$11,694,914 44

OPERATING EXPENSES AND TAXES.

Operating expenses, (50.85 per cent. of earnings,)	$5,946,839 66	
Taxes, (03.11 per cent. of earnings,)	264,666 64	
(Expenses and taxes, being 53.96 per cent. of earnings,)		$6,311,506 30
Net earnings		$5,383,408 14
From which deduct:		
For interest on funded debt,	$1,071,341 50	
Less amount to credit of interest and exchange,	8,564 04	
	$1,062,777 46	
For sinking funds,	45,120 00	
For dividends on Chicago & Milwaukee Railway Stock	994 27	
For rent of leased roads in Iowa, viz:		
The Chicago, Iowa & Nebraska Railroad	$460,734 51	
The Cedar Rapids & Mo. River Railroad	470,368 80	
		2,039,995 04
Leaving		$3,343,413 10
To which should be added:		
Balance to credit of income account, May 31, 1870		541,424 29
Total net income		$3,884,837 39

From which half-yearly dividends have been declared, as follows:

5 per cent. dividend on both the common and preferred stock, payable Dec. 30th, 1870	$1,750,943 80
5 per cent. dividend on both the common and preferred stock, payable June 30th, 1871, including amount of Government tax	1,800,334 42
	3,551,278 22
And there remains a balance to credit of income account, to be carried forward to new year, of	$333,559 17

The capital stock has been increased $89,050 during the year, $44,000 by exchange of Peninsular Railroad bonds for preferred stock, $44,000 by a similar exchange of the same company's bonds for common stock, $330 in preferred on account of past due stock dividends, $420 in common on the same account, and $300 in common for Chicago & Milwaukee stock. The total stock at the close of the year, including a small amount of outstanding scrip, was:

Common stock	$14,720,959 40
Preferred stock	20,415,013 42
Total	$35,135,972 82

Not included with above is $615,300 of preferred and $53,046 of common stock owned by the company and held by its trustees. It was originally issued for use in taking up stock of other companies with which it was consolidated.

The bonded debt was decreased during the year by $248,900, $737,900 of bonds being retired and $489,000 issued. In addition to these issues on account of the old lines, $3,150,000 of 7 per cent. gold bonds were issued last spring to provide for the construction of the Madison Extension.

The various accounts on the general ledger of the company, as they stand on the 31st of May, 1871, may be summed up as follows:

Original cost of road and equipment	$39,972,413 62	
New construction (since June 1, 1864)	6,405,234 62	
New equipment (" " ")	5,623,011 79	
Balance of sundry accounts	1,517 872 96	
	$53,518,531 99	
Represented by		
Common capital stock		$14 720,959 40
Preferred capital stock		20,415,013 42
Bonded debt		18,049,000 00
Income account		333,559 17
		$53,518,531 99

The expenditures for new construction during the year amounted to $1,767,985 75, of which $1,153,438.62 was for the Madison Extension, $201,659.74 for new line into Madison (including a mile and a half of pile and trestle bridging and depot grounds), $94,085.67 for right of way and additional station facilities, $84,899.65 for new side tracks, and $51,120 24 for cost of heavy rails laid, with that of the lighter ones removed. The cost of new equipment for the year was $160,160.05, bringing up the account for new equipment since June 1, 1864, to $5,623,011.79.

The value of operating supplies on hand at the close of the year, including fuel, was $873,179.98.

SOURCES OF EARNINGS FOR WHOLE ROAD.

	For 1869 and 1870.	For 1870 and 1871.	Increase.	Decrease.
First class local passengers	$2,917,707 71	$2,722,910 10	.....	$194,797 61
Second class local passengers	125,958 50	104,397 78	.....	21,560 72
Excursion	62,140 98	60,707 10	.....	1,433 88
Com'tation	110,962 70	160,675 28	$49,712 58	.....
Through passengers of all classes betw'n Chi. & Mo. R.	582,487 91	284,420 77	.....	298,007 14
Through fr'ts	539,634 93	437,3 3 22	.....	102,331 71
Oth'r freights	7,597,649 90	7,193,945 62	.....	403,704 28
Transportation of milk	50,312 27	69,559 95	19,247 68	.....
Transportation of express fr'ts	256,677 84	237,812 28	.....	18,865 56
Transportation of m'ls	173,306 40	189 585 36	16,278 96	.....
Transportation of extra baggage	20,669 59	16,122 93	.....	4,546 66
Miscellaneo's sources	97,919 48	217,474 05	119,554 57	.....
Totals	$12,535,428 21	$11,694,914 44	$204,793 79	$1,045,307 56

Total decrease, $840,513 77.
Per centage of decrease, 06 71-100.

The following is a comparative statement of the number of passengers and the number of tons of freight carried during the year:

	For 1869 and '70.	For 1870 and '71.	Percentage. Inc.	Dec.
No. passengers carried	2,276,549	2,289,494	...	1 63-100
No. tons carried	2,222,978	2,298,170	3 38-100	....
Total No. passengers and No. tons carried	4,499,526	4,537,664	0 85-100	...
No. passengers carried one mile	115,457,459	100,802,521	....	12 69-100
No. tons freight carried one mile	264,747,240	268,417,381	1 39-100	...
Total No. passengers and total No. tons freight carried 1 mile	380,204,699	369,219,902	....	2 89-100

The earnings per passenger and per ton of freight per mile were:

	For 1869 and '70.	For 1870 and '71.	Percentage. Inc.	Dec.
Earnings per passenger	$1 67	$1 49	....	10 78-100
Earnings per ton	3 68	3 35	....	8 97-100
Average earnings per passenger and per ton	$2 66	$2 43	....	8 65-100
Earnings per passenger per mile	3 29-100	3 31-100	0 61-100	....
Earnings per ton per mile	3 09-100	2 87-100	....	7 12-100
Average earnings per passenger and per ton per mile	3 15-100	2 99-100	....	5 08-100

From the foregoing it appears that while the number of tons of freight carried one mile increased 1 39-100 per cent., or 3,670,141 miles, the earnings per ton per mile decreased 7 12-100 per cent.; and to this enforced reduction in rates, in sympathy with the decline in the value of the more important classes of products, is attributable the loss in freight earnings.

The decrease in passenger receipts appears to be wholly due to the falling off in passengers carried, as the rate per passenger per mile seems to have been slightly increased, although the average earnings from each passenger shows a considerable decrease.

OPERATING EXPENSES.

The operating expenses and taxes were:

	Year ending May 31, 1870.	Year ending May 31, 1871.	Increase.	Decrease.
Repairs of engines and tenders	$590,449 48	$423,439 30	.....	$197,010 18
Repairs of cars	917,685 53	547,347 24	.....	370,338 20
" buildings	147,640 45	86,100 70	.....	61,539 75
" fences, gates and crossings	73,797 22	67,016 62	.....	6,780 60
Repairs of bridges and culverts	259,912 92	201,802 33	.....	58,110 59
Repairs of track	1,574,365 58	1,365,794 66	.....	208,570 92
" tools and machinery	182,022 51	92,954 90	.....	89,067 61
Fuel used on locomotives	976,349 68	647,063 09	.....	329,286 59
Fuel and lights used on cars and at stations	143,036 31	102,763 90	.....	40,272 41
Oil and waste used	117,248 49	84,875 76	.....	34 372 73
Office and station furniture and expenses	54,608 23	43,570 79	.....	11,037 44
Furniture and fixtures for cars	16,713 09	10,619 41	.....	6,093 68
Foreign agents	43,233 44	40,611 33	.....	2,622 11
Advertising	21,801 67	11,503 44	.....	10,297 23
Stationery, printed blanks, tickets, etc.	55,565 78	48,243 25	.....	7,322 53
Engineers, firemen and wipers	550,559 03	516,035 56	.....	34,443 47
Conductors, baggagemen and brakemen	369,360 19	351,404 85	.....	17,925 34
Laborers and switchmen at stations	653,492 20	594,630 98	.....	58,861 22
Agents and clerks at stations	498,435 88	525,595 06	.....	72,840 82
Superintendence	80,787 40	73,411 52	.....	7,375 88
Rents	37,618 78	41,980 28	$3,366 50	.....
Loss and damage	64,247 49	46,227 85	.....	15,019 63
Injury to persons	40,853 21	26,512 21	.....	14,341 00
Teaming freight, baggage and mails	10,205 76	9,813 45	.....	392 31
Insurance	22,721 50	13,580 00	.....	9,141 50
Miscellaneous exp's.	102,924 69	72,941 17	.....	29,983 52
Total	$7,606,631 51	$5,946,839 66	$3,366 5	$1,663,158 35
Add for State, county and town taxes and revenue tax stamps	311,231 12	333,078 60	21,847 48	.....
Add for United States tax on earnings	95,454 71	31,588 04	.....	63,866 67
	$8,013,317 34	$6,311,506 30	$25,213 9	$1,727,025 02
Per cent. of operating expenses to earnings, including taxes	63 93-100 pc	53 96-100 pc	.....	15 59-100 pc
Per cent. of operating expenses to earnings, excluding taxes	60 68-100 pc	50 85-100 pc	.....	16 19-100 pc
Per cent. of operating expenses to earnings, excluding miscellaneous expenses and taxes	59 86-100 pc	50 22-100 pc	.....	16 10-100 pc

In this account the enormous decrease in the cost of fuel (35 per cent.) is most striking.

The average cost per cord of wood used for all purposes, during the year ending May 31st, 1870, was $6.07, and for the year ending May 31st, 1871, $4.60.

The average cost per ton of coal used for all purposes, during the year ending May 31, 1870, was $5.16, and for the year ending May 31, 1871, $3.71, being a decrease of 24 22 100 per cent. for wood, and a decrease of 27 10 100 per cent. for coal.

The cost of fuel used by locomotives was 11 37-100 cents per mile run, against 16 51-100 cents the previous year.

The number of miles to the ton of coal and cord of wood for the year ending May 31, 1870, was 32 83-100 miles, and for the year ending May 31, 1871, 33 26-100 miles, being 43-100 of a mile in favor of the year just closed.

A large amount of repairs and renewals have been made and charged to operation, as follows:

Repairs of track	912,328 70
" " engines and tenders	231,0 3 53
" " tools and machinery	7,622 14
" " cars	147,228 60
" " bridges and culverts	108,178 20
" " buildings	37,749 42
Total	$1,444,160 61

being 22.78 per cent. of the gross operating expenses, against 16.02 per cent. expended for repairs the previous year.

The reduction in the pay-roll was from $4,410,670.68 to $3,717,911.99, a saving of $692,758.69, or 15¾ per cent.

The net earnings for the year, after satisfying all current charges for operating, taxes, interest, sinking funds and rentals, were $3,343,413.10, against $2,313,857.24 net earnings for the year ending May 31st, 1870. These earnings, with the balance of income at the beginning of the fiscal year, were sufficient to enable the Board of Directors to declare two semi-annual dividends of five per cent. each, on both classes of stock, and to leave a balance of $333,559.17 to be brought forward to credit of income on the 31st of May, 1871.

It is inevitable that the demands of business on our road, as upon all others similarly situated in the great and growing West, will call for some enlarged accommodations in the extension of side tracks, depot grounds, new station buildings, equipment, etc., from time to time, and it is a question for the board to consider at some future period in what manner this class of outlays shall be provided for.

Whether the means shall be found in the increased profits resulting from the legitimate growth of business which may be reasonably looked for in the future, or whether a larger reserve of income shall be kept to meet these wants by temporarily diminishing the rate of dividends from present earnings, or whether the improvements required from time to time shall be made from the proceeds of sales of stocks or bonds within reasonable limits, without impairing the ability of the company, are matters that will receive careful deliberation hereafter, and such measures adopted as shall be thought best to give stability and strength to the company.

EXTENSIONS.

The President gives the history of the Madison Extension, commenced under the charter of the Baraboo Air-Line Company, consolidated during the year with the Chicago & Northwestern. The line from Madison to La Crosse will be 126 miles long, and bonds at the rate of $25,000 per mile have been negotiated for its completion. Twenty miles, from

Madison to Lodi, were opened after the close of the company's year and before the publication of the report.

The La Crosse, Trempealeau & Prescott Railroad, 28 miles long, will connect the above road. It was purchased in 1867 when very little work had been done on it. The cost has been $1,302,422 05, chiefly raised by bonds guaranteed by the Chicago & Northwestern Company.

The Winona & St. Peter Railroad, which is a Minnesota extension of the two roads named above, is in operation 140 miles, with a branch 3¼ miles long to Mankato. The charter is for a line entirely across the State and to the Big Sioux River in Dakota, 120 miles beyond the present terminus. A land grant of 6,400 acres per mile will be secured by completing this according to the charter at the rate of at least 30 miles per year. Arrangements have been made to complete 30 miles, from St. Peter to New Ulm, during the current year. The cost of this road so far has been $5,112,907.76. The earnings of this road for its last fiscal year (ending October 31, 1870,) were little more than sufficient to pay operating expenses and interest on funded debt, owing to bad crops. The receipts have been unusually light the current year, so far, but are likely to improve greatly by reason of the large crops, part of which will be marketed before the end of October.

The St. Charles Branch, 2.4 miles long, was constructed during the year at an expense of $43,801.55, or $18,000 per mile, $35,000 of which was paid by the town of St. Charles.

The Iowa Midland, from Lyons to Maquoketa, 33 miles, was leased during the year, and its bonds at the rate $18,000 per mile were guaranteed by the Northwestern Company. It is to be extended 35 miles further, to Anamosa, this season.

The Geneva Extension of the Elgin & State Line Branch, ten miles, was agreed upon during the year reported and has been completed since. A road was in operation on this line many years ago, but the rails were removed. As the road-bed and right of way remained and were secured for a nominal sum, the cost was very small.

The Menominee Extension, from Fort Howard along the west side of Green Bay to Escanaba, connecting the Wisconsin with the Peninsula Division, will give access to important lumber mills and will secure large grants of land, if completed within two years.

It is proposed to issue first-mortgage 7 per cent. gold bonds at the rate of $22,500 per mile, and to finish the road from Fort Howard to the Menominee River, about 52 miles, within twelve months, and the remainder in time to secure the land grants. After the close of the fiscal year and before the issue of the report the entire issue of $2,700,000 of these bonds was negotiated, and a contract let for the completion of the line as far as Menominee by the 1st of May next.

The land grants which will accrue to the company on the completion of its various extensions will amount to about 2,000,000 acres, which, it is believed, will be worth $10,000,000 or more when they have been opened for settlement by the completion of railroad communication.

For want of room we are compelled to postpone the publication of the General Superintendent's report, which gives the earnings by divisions, and is very interesting.

PUBLISHER'S ANNOUNCEMENTS.

Railroad Equipments.

There appears in our advertising columns the card of the Atlas Works, of Pittsburgh, who make a specialty of equipping railroads with frogs, switches, bridge work and castings. Their locomotive cylinders and driving wheels have been particularly commended, and they have generally a reputation for thorough and careful work.

Railroad Gazette.

"Without a rival in its own department of journalism."—*Hannibal, (Mo.) Courier.*

"One of the best authorities in this country on railroad subjects."—*Chicago Tribune.*

"Unquestionably the best railroad journal in the United States."—*Shawneetown, (Ill.) Mercury.*

"The most reliable, comprehensive and accurate railway journal in America."—*Carlinville (Ill.) Democrat.*

The Roadmaster's Assistant and Section Master's Guide.

Of Mr. Huntington's new book, the announcement of which may be found in our advertising columns, many excellent commendations have been received from intelligent railroad men who appreciate the worth of such a record of valuable experience as well as from the public journals. From among the latter we append a few extracts:

"Mr. Huntington is a railroad builder of many years's experience, and is thoroughly conversant with his subject. * * * It is a simple matter of duty that all those who are engaged in the construction of railroads should provide themselves with this practical little manual."—*Chicago Tribune.*

"The work is evidently prepared by a practical man, and we recommend it to the careful study of roadmasters and section-men, as being well worth their perusal. There is no reason why the section man should not understand the science which lies at the foundation of his work: It is only by understanding it that he can rise in his business, and thus at once benefit both his employers and himself."—*Railway Times* [Boston].

"We do not remember to have seen a book more admirably adapted to its purpose than is this work of Mr. Huntington."—*American Builder.*

—The freight agents of roads connecting at St. Louis met in that city last week. One of the principal subjects of debate was the transportation of live stock from Kansas City to St. Louis, the rates for which had been reduced to almost a nominal charge. After some discussion, the representatives of roads connecting Kansas City with St. Louis agreed upon the rate $35 per car.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—The following have been elected directors of the Northern Vermont & Lake Champlain Railroad Company, whose line is to form the Vermont section of the Portland & Ogdensburg Railroad, extending from St. Johnsbury northwestward to Lake Champlain. H. Fairbanks, F. Fairbanks, St. Johnsbury; Carolus Noyes, C. Blodgett, Burlington; W. Brigham, Hydepark; L. B. Howe, Jericho, Vt., and Wm. B. Hatch, New York. Hon. H. Fairbanks was elected President, and C. Noyes, Secretary.

—A Board of Directors of the Red Wing & Menominee Railroad Company was organized at Ellsworth, Pierce County, Wis. recently. W. W. Phelps was chosen President; William Wilson, Vice-President; Charles Cox, Treasurer, and Dr. Andrews, Secretary.

—Since the lease of the Chicago, Cincinnati & Louisville Railroad (Michigan City to Peru, Ind.,) to the Indianapolis, Peru & Chicago Company, the officers of the entire line from Michigan City to Indianapolis, 161 miles, are David Marcy, Indianapolis, President and General Superintendent; V. T. Malott, Treasurer; A. B. Southard, Assistant General Superintendent; E. C. Murphy, Superintendent Michigan City Division; L. G. Cannon, Secretary; L. N. Andrews, General Freight Agent; F. P. Wade, General Ticket Agent. All reports and correspondence relative to the several departments should be addressed accordingly. The General Superintendent, Treasurer and General Freight Agent held the same positions in the Indianapolis, Peru & Chicago Company before the lease. The Assistant General Superintendent was formerly Secretary of that Company, and Mr. Murphy, the Superintendent of the Michigan City Division, was formerly Superintendent of the Chicago, Cincinnati & Louisville road.

—At the annual meeting of the Athol & Enfield Railroad, of Massachusetts, on the 1st inst., Willis Phelps, of Springfield; Edward Smith, R. D. Woods and W. B. Kimball, of Enfield; R. H. Allen, of Prescott; S. P. Bailey, of Greenwich; C. Southworth, of Hardwich; J. W. Goodman, of North Dana; Samuel Adams, of New Salem; J. C. Hill and T. H. Goodspeed, of Athol, were re-elected directors. Willis Phelps was re-elected President, and R. D. Woods, Vice-President. T. H. Goodspeed was chosen Treasurer.

—Lloyd Tevis, Leland Stanford, Charles Crocker, C. P. Huntington, Mark Hopkins, Charles Mayne and Peter Donohue, have been re-elected directors of the Southern Pacific Railroad Company of California.

—John W. Brown has been appointed General Passenger and Ticket Agent of the Indianapolis, Bloomington & Western Railway, in place of N. E. Scott, resigned. Mr. Brown comes to his new office from St. Louis, where he has for some time been agent for the Pan Handle Route. Before he was General Ticket Agent for the Ohio Central, and afterward Traveling Agent of the Baltimore & Ohio Railroad, when that company gained control of the Ohio road.

PERSONAL.

—Dr. C. G. Young, President of the Houston & Great Northern Railroad, and William M. Wilson, Assistant Civil Engineer, were killed by an accident to a train on the Houston & Great Northern Railroad lately, and Edward P. North, its new General Superintendent, and C. E. Noble, Chief Engineer, were severely injured. The accident was caused by obstructions placed on the track by malicious persons.

—John F. Tracy, President of the Chicago & Northwestern and the Chicago, Rock Island & Pacific railroad companies, sailed from New York for Europe in the Scotia on the 16th inst.

TRAFFIC AND EARNINGS.

—The traffic receipts on the Grand Trunk Company's lines for the week ending July 8 amounted, for 45,720 passengers and emigrants, to £12,956; for mails and expresses, to £1,233; and for 26,712 tons of freight and live stock, to £17,163—total, £31,352; and for the corresponding week last year, to £29,726, showing an increase of £1,626.

—The receipts of the New Jersey Southern Railroad (Port Monmouth to Atco, with branches to Long Branch and Tom's River) for the four months ending with July, 1871, were $216,634.81; for the corresponding period last year, $158,206.18—showing an increase of $58,478.63, or 37 per cent.

—The earnings of the Grand Trunk Railway of Canada for the week ending July 15 were £31,700, against £28,900 for the corresponding week of 1870, showing an increase of £1,800, or a little more than 6 per cent.

—The total shipments of coal from Cumberland, Md., for the year 1871, up to July 29, were 1,289,390 tons, of which 815,327 were moved by the Baltimore & Ohio Railroad, and 474,062 tons by the Chesapeake & Ohio Canal.

—The New Orleans *Picayune* publishes a statement in which it says: "It will be seen that about fifteen per cent. of all the produce sent south from St. Louis comes *via* the Iron Mountain road. If the figures for the Illinois Central, the Ohio & Mississippi road and the two roads to Indianapolis could be ascertained, they would show, no doubt, that at least twenty-five per cent of the Southern bound freight from the West has abandoned the river route. The shipments south from Louisville and Cincinnati would, beyond doubt, show a decided preponderance in favor of the railroad. Even as bulky an article as tobacco comes through to New Orleans from the former place nearly the whole season as cheaply by rail as by river, and sometimes more cheaply. The river route has not been able to compete with the railroads across the country to the seaboard, and it is even falling behind in the competition with longitudinal roads, and this is the case with both up and down freights. Several cargoes of coffee have this season gone through Mobile, and thence west by the Iron Mountain road. Freight and insurance considered, that is the cheapest route for a St. Louis merchant to import coffee by."

—An agreement has recently been made between the Milwaukee & St. Paul, the Chicago & Northwestern, the Lake Superior & Mississippi railroads and the steamboat lines on the Upper Mississippi, whereby the rates of freight are to be the same from all Upper Mississippi points to Chicago, Milwaukee and Duluth. The St Paul *Press* remarks on this as follows: "The managers of the principal freight lines interested in the freight traffic of the Northwest have formed a ring for the regulation of the rates of freight for the future, and that they propose a heavy advance on the principal part of their business. The most surprising portion of this news is that which tells us that the Lake Superior & Mississippi Railroad has consented to surrender its many advantages for the benefit of its rivals, who formerly held undisputed sway over the transportation business of the Northwest, but whose scepter was supposed to have departed on the completion and opening of the shorter line to lake naigation. According to our special dispatch from Milwaukee, the rates of freight are to be uniform between either Duluth or Chicago and points on the Mississippi River. As lake freights have been and are likely to continue higher on Lake Superior than on Lake Michigan, we are afraid this arrangement will upset Duluth's claim to the commercial supremacy of the West. Chicago will be able to give her several points in every game and then beat her out of sight."

OLD AND NEW ROADS.

Illinois Central.

A meeting of the stockholders of this company is called to be held at the office in Chicago at noon of the 29th of November next.

Chicago & Northwestern.

The bridge over the Wisconsin River at Merrimac for the Madison Extension is completed, and the first train crossed on the 15th inst. By the end of the month it is expected that the road will be completed to Baraboo, nine miles further. Some business may be received at Merrimac from the boats running on the Wisconsin River.

Iowa Southwestern.

The Hon. Wm. P. Wolf informs the Iowa City *Republican* that the grading on this road (Clinton to Oskaloosa) between Tipton and the Cedar, is about completed. He is confident that the cars will run into Tipton in November. The contract has been let for the ties from Clinton to Iowa City.

Sale of Tennessee Railroads.

The State Railroad Commission of Tennessee, composed of Governor Senter and others, have issued an order far the sale of the Knoxville & Charleston, Rogersville & Jefferson and Knoxville & Kentucky railroads at public auction, September 20, and unless the decree of the Chancery Court be complied with by the Nashville & Northwestern Railroad, ordering payment of its debt to the State within thirty days from July 8, that road will also be sold. The Commission has also ordered the interest of the State, being its mortgage debt, in the Southwestern Railroad and the Western & North Carolina Railroad, to be sold. Meantime, sealed proposals will be received by the Comptroller at Nashville, to be opened the day of sale, and should such proposals be accepted, no sale of the road to which they apply will be made. Payments may be made in bonds of the State, and coupons, one-fourth down.

Mineral Point Extension.

A correspondent writes to us as follows: "The Mineral Point Railroad Company have been engaged for some time in making preliminary surveys for an extension of their road north from some point near Mineral Point, the present terminus of the road, and have determined on building on a line which leaves the old road about two and a half miles north of Calamine, and runs up the west branch of the Pecatonica River to Mifflin, then to or near Highland, thence down the Blue River to Muscoda, on the Milwaukee & Prairie du Chien Railroad. It is the intention of the company to locate and put under contract the line above described immediately if the necessary local aid can be obtained, of which there are very encouraging prospects.

"The country through which the line runs is one of the finest agricultural sections of Southwestern Wisconsin, and at Mifflin and Highland are some of the best mineral leads in the State of lead and zinc ores, the latter of which is now being brought into prominent notice.

"It is proposed to extend the road to Tomah, to connect with the West Wisconsin, making a desirable route to St. Paul and the Northwest. The surveys for the latter portion of the road will be made this fall."

Missouri, Kansas & Texas.

There is talk of making a branch of this road from Parsons southwest to Indian Territory line at or near Parker, a distance of about 30 miles. Parker is about two miles east of the terminus of the Leavenworth, Lawrence & Galveston Railroad.

Ohio & Michigan.

This road is now nearly graded from a point near the State line, 30 miles easterly from Coldwater, to Allegan, except the distance intervening between Battle Creek and Augusta, upon which work is about to commence. Work on the bridges at Battle Creek will also soon commence.

Atlantic & Lake Erie.

Concerning this railroad the Cincinnati *Railroad Record* says:

"The Atlantic & Lake Erie Railway is, in substance, to go from Toledo southeast through Athens to Pomeroy, the southern end passing through Sunday Creek Valley. The main object of this road is to supply the Northwest with coal and iron from the mineral region of Perry, Athens and Meigs counties, and on the other hand to afford an outlet on the Ohio to the produce of Central Ohio going south. * * *

"This road is almost all under contract, and a considerable part ready for the iron. The principal towns on the line, as under contract, are Chauncey (Athens County), New Lexington (Perry County), Granville and Hartford (Licking County), Bucyrus (Crawford County), and thence direct to Toledo. The road is, we believe, about 250 miles in length."

The company is offering $5,000,000 of its first-mortgage bonds to complete the road.

Hastings & Dakota.

The grading of the extension of this railroad from Fairfield to Carver, 20 miles, was completed last week and its bridge over the Minnesota at Carver was made ready for iron at the same time. The track will be laid directly and trains are to be running regularly between Hastings and Carver by the 1st of October.

Chicago & Southwestern.

Proposals for the construction of a branch of this road from a point west of Plattsburg, Mo., nearly due west to the Missouri River opposite Atchison, about 30 miles, will be received at the office of the Vice-President, James N. Burnes, at Weston, Mo., down to the 23d inst., including grading, bridging, building depots and water tanks, furnishing ties and laying iron. The company will furnish the rails, joints and spikes.

Boston & Lowell.

A special meeting of this company was held in Boston on the 17th inst. to act on a proposition to purchase the Salem & Lowell and Lowell & Lawrence railroads, authorizing the directors to sell certain real estate. After a statement by General Stark of the desirability of their purchase and cost, Colonel John H. George offered a resolution that the directors be authorized to appoint trustees to make the purchase, provided that the purchase shall not be less than the majority of stocks; also, that the directors be authorized to dispose of any surplus real estate. The resolution was unanimously passed. Both these railroads have been for some time operated by the Boston & Lowell under a lease. The Salem & Lowell is 17 miles long, and the Lowell & Lawrence 12 miles.

South Side of Long Island.

This company has a very pretty quarrel with Jamaica, a suburban town of some importance. It seems that the company desired the privilege of improving its line in that town by constructing a new track. The trustees of the town (which has long considered itself aggrieved by the company with respect to the accommodations furnished) would grant permission to lay the new track only on condition that additional accommodations should be guaranteed. Not only does the railroad company refuse to accept these terms, but it has surveyed a new line entirely outside of the village of Jamaica which will shorten its main line two miles, leave Jamaica on a switch a mile from the nearest station at which regular trains will stop, and leave it, probably, only a train or two daily to connect it with New York.

The latest report is that the trustees of the town have withdrawn their opposition to the original plan of the company and that trains which had for some days passed through Jamaica without stopping, are now stopped as before. The whole quarrel is an illustration of the difficulties which attend the regulation of the relation of railroads to their customers, and of the great power a company may exert by withdrawing or threatening to withdraw its accommodations.

New York Railroads.

The Poughkeepsie & Eastern Railroad is rapidly progressing. The line from Stissing to Pine Plains is not building at present, but if a satisfactory arrangement cannot be effected with the Dutchess & Columbia Railroad Company for the use of its track, the Poughkeepsie & Eastern line will run nearly parallel with it. From Pine Plains the road will pass northeast into Columbia County, and thence eastward through Ancram to Boston Corners, where the Harlem River is crossed, and near which the road re-enters Dutchess County, continuing southeast to the State line. The only heavy work is in Ancram, where rock cuttings will be made, and several high trestles constructed. Work has been advancing on this section since April 1. From Pine Plains to the line of Columbia County the right of way has all been obtained, either by agreement or award of damages by commissioners, and the contractors are about to begin work. It is expected that all the sections of this road will be completed by November 1.

A transfer of $2,000,000 in bonds from the Rensselaer & Saratoga Railroad Company to Joseph M. Warren and others, trustees, has been filed in the Albany County Clerk's office. Of this amount, $1,625,000 will be used in paying outstanding bonds of the company, and provision will be made for $375,000 in the lease of the road to the Delaware & Hudson Canal Company.

The Midland Railroad Company purpose to build a road from Hancock, Delaware County, to Carbondale, Penn., 25 miles, to accommodate the coal traffic.

The contract for building the Middletown & Delhi Railroad, a branch of the Rondout & Oswego road, has been awarded to F. C. Crowley, of New York. The road will be 30 miles long, running entirely in Delaware County, and will be speedily completed.

A section of the Northern Central Railway, between Canandaigua and Elmira, will soon fall into the possession of the Erie Railway Company, which has made an extension of the branch from Canandaigua to Avon, where it will connect with the main line to Buffalo. The Northern Central, anticipating the surrender of this branch, has surveyors at work on the east side of Seneca Lake on a new line to connect with the New York Central. Whether the connection will be made at Geneva or a line be adopted from Horseheads, Chemung County, *via* Mecklenburg, to Seneca Falls, has not been settled.—*New York Tribune.*

North & South (of Colorado).

The Denver *News* gives information of the formation of this new company in the interest of the Maxwell Grant Company: "The plan of the company is to build the ordinary four-feet eight-and-a-half-inch gauge, and run a line direct from Cimarron to some point—probably Kit Carson—on the Kansas Pacific, provided this company will offer satisfactory inducements, and co-operate in a manner adequate to the importance of the proposed road as a branch and feeder. Co-operation with the Denver & Rio Grande Company is also proposed, provided this company locate their route *via* Trinidad and the Raton Pass to Cimarron, thence striking the Rio Grande Valley at or near Albuquerque. These two propositions are under consideration, and will be discussed, and one or the other decided on within a few days or weeks at the most. Engineers are now at work, and the representatives of the Maxwell Company, now in this city, including the President, Mr. Collinson, do not hesitate to declare their intention to secure as speedy a railway connection as possible."

Charleston, Ripley & Parkersburg.

This company was organized at Charleston, W. Va., on the 14th inst., for the purpose of constructing a railroad from Charleston, on the Chespeake & Ohio Railroad, nearly due north about 70 miles to Parkersburg, on the Ohio. Among the directors ar eGovernor Jacob West, of West Virginia; Judge Robert Brown, of Ravenswood, and ex-Governor Stevenson. J. Brisbin Walker is President, John J. Jackson, Vice President, and C. C. Lewis, Secretary and Treasurer. Surveys for the location will commence at once.

Springfield & Northwestern.

At a meeting of the directors of this road in Springfield on the 1 th, it was decided to locate the road on the south side of the Sangamon River between Springfield and Petersburg. Arrangements were also completed for building the line from Lewiston, Fulton County, to the Mississippi River. Messrs. Kilbourne, Bower & Co. are the contractors. The grading is completed between Petersburg and Havana, and the iron is now going down.

Ironton, Portsmouth & Cincinnati.

Another survey of this proposed road has just been made from Cincinnati up the Ohio River to the mouth of the Big Sandy River, where the State lines of Ohio, West Virginia and Kentucky meet. It is expected to meet there the Chesapeake & Ohio road.

According to this survey, it appears the distance from Columbia (eastern suburb of Cincinnati) is from 92 to 93 miles, which, it is claimed, can be reduced to 90 miles. The maximum grade is only 35 feet, while the curvatures are easy. The tunneling required will be, in the aggregate, but 600 feet. Through Clermont and Brown counties, a distance of 54 miles, it is about a straight line, with few bridges and culverts of an expensive character.

Valley Railroad.

A telegram to the Richmond *Dispatch*, dated Lexington, August 1, says:

"The Valley Railroad Company met here to-day. The representation was full. The amount of subscription necessary to secure the subscriptions of Baltimore city and of the Baltimore & Ohio Railroad Company was reported raised and the cash quotas provided for. The company organized permanently. Mr. Robert Garrett, as President, and fifteen directors were elected—the same as were elected at a former meeting. Propositions were submitted by different sections along the line offering large subscriptions and the right of way, free of land damages, if the road be run on their routes. A corps of engineers is already in the field making a permanent location.

Northern Pacific.

Mr. Thomas B. Morris, Engineer of the Pacific Division, advertises in the Kalama (Washington Territory) *Beacon* for proposals for grubbing and clearing 40 miles of the road from Tantle River northward Proposals were to be received up to the 21st of August.

W. Milnor Roberts, the Chief Engineer, arrived lately in Helena, Montana, to direct the surveys in Western Montana and across the mountains.

A dispatch says that the section of the North Pacific east of the Mississippi, 120 miles long, has been accepted by the company from the contractors. Heretofore it has not been open for business, and has been used almost exclusively for forwarding construction.

Lexington, Lake & Gulf.

There are 82 miles of this road graded from Lexington, Mo., on the Missouri River, southeast through a corner of Jackson County to Pleasant Hill, and from there nearly due south, passing 4 miles east of Harrisonville, to Butler, in Bates County. The people of Fort Scott are endeavoring to turn the road toward their city.

Minnesota & Northwestern.

The Albert Lea (Minn.) *Standard* says that H. W. Holley, the Chief Engineer of the Southern Minnesota Railroad, has just returned from New York, bringing the news that Colonel Thompson, the President, has succeeded in negotiating money, and will complete the above road from Wells, on the Southern Minnesota, northwest to Mankato, a distance of 32 miles. No work is to be done south of Wells, so the road will be, for the present at least, substantially a branch of the Southern Minnesota.

Atchison & Nebraska.

This railroad is now located to Table Rock, in Pawnee County, Neb., about 40 miles from Rulo.

Orange, Alexandria & Manassas.

The Richmond *Whig* reports that the part of this company's road in the Shenandoah Valley, from Strasburg southward to Harrisonburg, 51 miles, has been transferred to the Baltimore & Ohio Company, which will therefore be able to run trains through between Harrisonburg and Baltimore by way of Harper's Ferry. The distance to Harper's Ferry is 102 miles.

Baltimore & Ohio.

The Cincinnati trains of this road now go by way of Parkersburg and the Marietta & Cincinnati Railroad, crossing the Parkersburg Bridge. Formerly thev went by Wheeling and Benwood and the Central Ohio road, by which it is necessary to use the Little Miami road to enter Cincinnati.

Union Pacific.

There was a report in New York last week that an agreement for a consolidation, or at least for a division of business, has been made between this and the Pacific Mail Company. It was rumored that the Pacific Mail would cease to compete for the passenger business between New York and San Francisco.

Alabama & Chattanooga.

The Knoxville *Chronicle* reports on what his considered good authority that a combination of Southern railroads is forming to operate the Alabama & Chattanooga Railroad. The East Tennessee, Virginia & Georgia road pays $500,000 and the Mobile & Ohio road pays $300,000 back January and July interest on the Alabama State bonds and floating debt of the Alabama & Chattanooga Railroad.

Leavenworth, Lawrence & Galveston.

The point of reaching the southern line of Kansas by this road has been fixed at a point about one mile west of the east townships line in range 16, and about three miles west of the town of Parker, and on the west side of the Verdigris River. The town at the terminus, where the cattle yards are to be, will be called "Walker."

St. Francis & Megantic International.

The survey for this railroad (just north of the eastern border of Maine) is progressing very favorably, and it is expected that some ten or fifteen miles will be placed under contract this fall.

Texas Pacific.

Proposals have been made and favorably considered for the sale of the Southern Pacific Railroad (Shreveport, La., west to Fairview, Texas, 66 miles) and of the branches of the Southern Transcontinental Railroad to this company.

Cincinnati & Indianapolis Junction.

This railroad, extending from Hamilton, O., (25 miles north of Cincinnati on the Cinninnati, Hamilton & Dayton Railroad) to Indianapolis, 98 miles, with a branch from Connersville, Ind., (56 miles southeast of Indianapolis) northwestward to Newcastle 25 miles, it is proposed to transfer to the Cincinnati, Hamilton & Dayton Railroad Company.

The status of the Indianapolis Company, upon which this arrangement was made, is as follows:

It is incumbered by a first mortgage to secure $1,200,000, a second for $800,000 and a third for $800,000 yet to be issued. It owes a floating debt of about $1,000,000, and has issued a preferred stock of over $1,000,000. Its equipment is estimated at $300,000.

The contract is substantially the following:

1. That the Junction Railroad Company shall transfer and deliver to this company, as owner, a majority of its common stock and $500,000 of the preferred stock, so as to give the Cincinnati, Hamilton & Dayton Railroad Company the ownership and control of its corporate organization and property.

2. That the Cincinnati, Hamilton & Dayton Railroad Company shall then, by means of that corporate organization, and not as lessee, operate the road, in connection with its own, to the best advantage.

3. That the Cincinnati, Hamilton & Dayton Railroad Company shall advance its notes to the amount of $500,000, payable in one, two, three, four and five years, in equal installments, with interest at seven per cent. per annum, payable annually, as a loan, with which assistance the Junction Railroad Company is to retire and extinguish the entire floating debt, before the contract takes effect.

4. This loan is to be repaid, principal and interest, out of the net earnings of the road, after payment of interest on the first and second-mortgage bonds, and the entire issue ($800,000) of the third-mortgage bonds is to be placed in the custody of this company as collateral security therefor.

5. The coupons on $600,000 of the second-mortgage bonds, up to and including those falling due September 1, 1874, are to be cut off and canceled, so that until March 1, 1875, no payments, on account of interest on bonds, will have to be made beyond $98,000 per annum.

6. But the Cincinnati, Hamilton & Dayton Company is not in any way to assume any liability for the Junction Railroad Company, nor guarantee the payment of any of its obligations, principal or interest.

Central Pacific.

A telegram from San Francisco says that Colonel Von Schmidt is negotiating in behalf of the Lake Tahoe Water Company with the Central Pacific Railroad, to construct a tunnel through the Sierra Nevada of sufficient size to admit of the passage of trains and a canal both. This would save the road seven miles distance, 1,000 feet ascent and decent, and obviate the snow sheds almost wholly.

By a fire at Emigrant Gap, on this road, it is reported that one-half or three-quarters of a mile of snow-shed was destroyed.

California Pacific.

This road is finally absorbed by the Central Pacific, which now controls all the railroads in California except some very short lines. On the 10th inst. the election of the California Pacific was held, at which directors of the Central Pacific were elected its directors, and Leland Stanford, President of the Central Pacific, its President. Milton S. Latham, late President of the California Pacific, was chosen its Treasurer. The main line of the California Pacific extends from Sacramento southwestward almost in a direct line 60 miles to Vallejo, at the head of the northern arm of San Francisco Bay, 23 miles from San Francisco. It is the most direct connection between San Francisco and Sacramento, that by way of Oakland being 55 miles longer. The California Pacific has also a branch at Adelante, eight miles north of Vallejo, northward to Calistoga, 38 miles, and one from Davis Junction, 48 miles northeast of Vallejo (12 miles west of Sacramento) northward to Marysville, 43 miles. It has also some branches and extensions under way. It has the only lines in California west of the Sacramento River, and, with proper extensions, may easily be made to serve all that part of the State.

New York & Boston Shore Line.

This line, consisting of the New York & New Haven, the New Haven, New London & Stonington, the Stonington & Providence, and the Boston & Providence railroads, has lately put a fine new ferry-boat on the Thames River to transport passenger trains to New London. On this boat meals will be served, and the passengers given half an hour to eat them.

Paterson & Newark.

This New Jersey railroad, 12 miles long, which was constructed for the use of the Erie Company, which guaranteed its bonds and operated it under a lease, was sold on the 1st inst. to satisfy a judgment. L. D. Rucker, General Superintendent of the Erie Railway, was the purchaser, presumably for the company.

Tuckerton Railroad.

This railroad, which is to extend from Whiting's Junction, on the New Jersey Southern Railroad 41 miles south of Port Monmouth, southeastward 17 miles to Barnegat, on the coast, and thence southward along the coast 12 miles to Tuckerton, on Little Egg Harbor, about 29 miles, is in course of construction, to be completed next month. It will give access to great oyster-beds, which are expected to give it a large traffic.

The Pennsylvania Company.

A telegram from Louisville, dated the 12th, says that representatives of the "Pennsylvania Company," which is the bureau representing the Pennsylvania Railroad Company, managing the interests of the latter company west of Pittsburgh, were there that day, and completed negotiations with the Jeffersonville, Madison & Indianapolis Railroad and branches, and the Louisville Bridge. The Pennsylvania Company purchased about three-fourths of the stock of these corporations, amounting to about $2,000,000. Thomas A. Scott was elected President of the railroad and the bridge company, Mr. Rickets, the former President, having resigned. A number of old directors also resigned, and William Thaw, J. N. McCullough, H. H. Houston, G. B. Roberts, H. J. Jewett and W. P. Shinn were elected to their places. By this arrangement the Pennsylvania Railroad Company secures control of the railroad bridges across the Ohio River at Cincinnati and Louisville, and, therefore, of all through lines leading over them to the South and Southwest, giving that company a commanding position in regard to traffic with these sections. It is understood that liberal arrangements were made with the Ohio & Mississippi road, by which it will be enabled to cross the bridge at that point.

Northern Pacific.

It is reported that an agreement has been made between this company and the city of Duluth, whereby the company is to construct a canal across Minnesota Point, reimburse the city for the work it has done on this canal, furnish an additional dredge, and take the bonds of the city at 80 cents on the dollar, to enable it to construct a dyke across the bay at once, broad enough for several tracks. This will secure a good harbor for Duluth.

Peoria, Atlanta & Decatur.

All the grading and bridging on the part of this line between Peoria and Atlanta, 39 miles, are under contract to be completed October 1.

La Clede & Fort Scott.

There is talk of constructing a branch of this road, or rather a cross line, from Kansas City southward through the western tier of counties of Missouri nearly parallel to the Missouri River, Fort Scott & Gulf Railroad.

United States Central.

St. Louis advices say that John Collins, of London, England, President of the Maxwell Land Grant & Railway Company of New Mexico; S. W. Gears, of New York, and S. H. McMullen, of London, have returned from a visit to the lands of the Maxwell Land Company, and report that, in company with John L. Reed, Vice-President, of London; W. W. McFarland, of New York, Attorney of the company; L. Bayzron, of Holland; Ex-Governor Hunt, of Colorado; General W. J. Palmer and W. N. Byers, of Denver, and a surveying party under W. R. Morley, Chief Engineer of the Maxwell Company, they left Denver July 1, to select a route for a railroad from the Kansas Pacific road through their lands to some point south. They finally determined to locate the line commencing at Kit Carson, on the Kansas Pacific road, running through the Cimmaron Valley to El Paso, New Mexico. The road will be 200 miles long, of ordinary gauge; will be commenced immediately, and probably completed next year. The capital stock is $10,000,000, which will be furnished from abroad.

Wilmington, Columbia & Augusta.

This railroad has long been in operation from Wilmington, N. C., to Columbia, S. C., and it is now proposed to extend it from Columbia to Augusta. The Charlotte, Columbia & Augusta Company has had a road in operation between these two places for about two years, and as the country is very thinly settled, almost entirely without towns of any kind, and comparatively unproductive, the field would not seem very promising for a competing road. It is proposed, however, to construct the new road on a pretty direct line, which would be for much of the way from eight to twelve miles south of the old road, and 24 miles shorter.

Plymouth, Kankakee & Pacific.

A contract to furnish 40,000 ties in Putnam County has been let, and work is to be commenced on the Illinois River Bridge, opposite Hennepin, in a very few days.

Blue Ridge Railroad.

A new company has agreed to purchase the interest of the State of South Carolina in this railroad, and to complete it within five years. It is proposed to make it of 3-foot gauge.

Cleveland, Mt. Vernon & Delaware.

The grading of this road is progressing with considerable energy and some heavy work is found in the cut through the "Summit" 16 miles south of Millersburg, where the largest force of workmen is concentrated. This cut is ¼ of a mile long and 50 feet deep. It is intended to put a night force on the work to hasten its completion.

St. Louis & Fort Scott.

There is a rumor that the New York Central Company, or the capitalists who control it, has agreed to construct and operate this railroad, whose course will be about midway between the Missouri Pacific and the Atlantic & Pacific.

Vineland Railroad.

The Vineland Railroad, from Winslow to Vineland, N. J., 17 miles, is now in running order and ready for traffic. It will be pushed through to Atsion, 9 miles further, as rapidly as possible. Then Vineland will have a direct and short connection with New York.

Jackson, Lansing & Saginaw.

The iron is now laid twenty-four miles north of Wenona, and within four miles of Standish, on Pine River. At this place a junction is to be made with the Shore Road to Alabaster and Au Sable.

Washington & Ohio.

This company, whose road is in operation from Alexandria westward to Hamilton, Va., invites proposals from contractors for the construction of 31 miles more, to Winchester, on the Shenandoah, to be completed by next May.

Kansas Central.

On the 15th instant election was held in Leavenworth at which by a majority of 4,000 it was voted to subscribe $250,000 towards the construction of this proposed narrow-gauge railroad from Leavenworth to Denver. It is believed that all the counties on the line in Kansas will vote aid, and that 50 miles will be constructed this season.

Sorel & Sutton.

This railroad is to extend from Sorel, on the St. Lawrence at the mouth of the Richelieu River and about 50 miles below Montreal, southeastward to a junction with the Grand Trunk at Acton about 40 miles, and thence nearly due south to Richford, Vt., on the Missisquoi & Clyde River road, using about ten miles of the Southeastern Counties Railway from North Sutton to Richford. It will be altogether about 80 miles long, and will probably be a feeder of the Connecticut & Passumpsic Rivers Railroad, which will form its southern outlet. The whole line is under contract and much of it graded.

Lewisburg, Centre & Tyrone.

This narrow-gauge railroad, which is to extend from Lewisburg, on the Susquehanna, west by south on a line nearly parallel with and about ten miles north from the Middle Creek Railroad through Union and Centre counties, Pa., is to be completed from Lewisburg to Mifflinsburg, nine miles, by the end of this month. Twenty miles in Centre County has been located and will soon be under contract.

Prince Edward Island.

For the construction of the proposed narrow-gauge railroad through this island twenty-two tenders were sent in from leading contractors in England, the United States, the Upper Provinces, New Brunswick and the Island. Messrs. T. & C. Walker, of London, England, put in the lowest tender, which is £4,035 currency per mile. This was accepted.

Whitby & Port Perry.

This railroad, extending from Port Whitby (on Lake Ontario, 30 miles east of Toronto) northward about 20 miles to Port Perry, on Lake Scugog, is ready for the iron, which has arrived and is being laid. It will give access to a considerable system of water navigation in connection with Lake Scugog, and an outlet to considerable lumber and timber.

Wisconsin Central.

The following are the officers and directors of this company, which has made rapid progress with its line this season: Gardner Colby, Boston, Mass., President; George Reed, Menasha, Wis., Vice-President; Samuel H. Walley, Boston, Mass., Treasurer. Trustees, George T. Bigelow, Boston Mass.; John A. Stewart New York Directors, Gardner Colby, Boston, Mass.; George Reed, Menasha, Wis.; E. E. Barney, Dayton, Ohio; E B. Phillips, Chicago, Ill.; Charles L. Colby, Samuel Gould, Boston, Mass.; Matthew Wadleigh, Stevens' Point, Wis.; E. G. Roberts, New York; Curtis Reed, Menasha, Wis.

Staten Island Shore.

At the Real Estate Exchange, No. 111 Broadway, last week, the property known as the Staten Island Shore Horse Railroad was sold at public auction for $31,000. The road runs from Port Richmond to the Fort, is seven and three-quarter miles in length, has been in operation for several years, and has not proved a very lucrative investment. The sale was made under the direction of C. C. Norvell, Esq., Trustee, under a nominal mortgage of $200,000 made to secure the payment of interest upon bonds issued. The purchaser of the road was Mr. James Moore, of New Jersey, and the purchase is supposed to have been made in the interest of one of the railroads of that State.

Augusta & Port Royal.

The Augusta (Ga.) *Constitutionalist* says that this railroad and its franchises have been purchased by Mr. James Appleton and some other gentlemen of New York and South Carolina.

Detroit, Lansing & Lake Michigan.

It was expected that this road would be completed from Detroit to Lansing, 103 miles, by the close of this week. The road has for some time been in operation from Lansing northwest through Iowa to Greenville, 57 miles, and it is intended to have it completed 20 miles further, to a junction with the Grand Rapids & Indiana Railroad at Howard, before the end of September, when there will be 180 miles of road in operation, leaving about 60 miles to be built to complete it to the lake at Pentwater.

Southeastern Counties Junction.

This road is the Canadian portion of a new line which is to give the Connecticut & Passumpsic Rivers road a connection with Montreal. Its northwestern terminus is at West Farnham, 14 miles east of the Stanstead, Shefford & Chambly Railway, southeatward to Richford, Vt, about 35 miles.

Northern Vermont & Lake Champlain.

This is a short line to connect the Lamoille Valley Railroad with Burlington. It will diverge from the Lamoille Valley road at Cambridge and extend thence southwestward to the Vermont Central Railroad at Essex Junction, six miles east of Burlington.

Canada Midland.

This road extends from Port Hope, on Lake Ontario, northwestward to Beaverton, on Lake Simcoe, a distance of 66 miles, with a branch from Millbrook to Peterborough, 13 miles. The *Canadian Monetary Times* says:

"The purchase of this road by a new company has taken place, Mr. Henry Covert and his co-directors retiring. Mr. Covert, as is well known, was substantially the owner of the line. The sale is reported to have been made on terms that show a clean profit to him of a large sum—said to be some hundreds of thousands of dollars. The new board is constituted as follows: President, Lieut. Colonel D'Arcy Boulton; Vice-President, Adolphe Hugel, Esq., of New York; Directors, Hon. Wm. Cayley, Auditor-General of Ontario, Toronto; A. T. H. Williams, Esq., M. P. P., Port Hope, and James McLennan, Esq., Barrister, Toronto. No change has been made in the other officers connected with the road."

Baltimore, Pittsburgh & Chicago.

The Toledo *Blade* learns that the survey for this railroad is completed from Pittsburgh to Havana, a small station on the Lake Erie Division of the Baltimore & Ohio Railroad, eight miles south of Monroeville, Ohio. Thence it is expected, according to the programme now being pursued, the line will run to Defiance, on the Toledo, Wabash & Western Railroad, crossing on its way the Dayton & Michigan Railroad at a point now called Ellsworth. From Defiance it is expected that the engineers will work their way along to Bryan and through Legrange and Steuben counties to Laporte, Ind.

Grand Rapids & Indiana.

The earnings of this road for year ending June 30, 1871, were:

From passengers	$234,056 87
From freight	260,776 51
Miscellaneous earnings	17,503 50
Total	$511,639 88
Expenses	248,496 59
Net earnings	$263,143 20

Louisville, Cincinnati & Lexington.

The change in the gauge of this railroad from five feet to four feet eight and a half inches, was commenced at daylight on Sunday, the 13th inst., and was successfully completed. The largest section was done in six hours and fifty minutes; the shortest in three hours. The entire distance is 174 miles, embracing both the Louisville & Cincinnati Short Line, and the road from Louisville Junction to Lexington. Eight hundred and six men were employed.

Ottawa, Oswego & Fox River Valley.

The town of Batavia lately brought suit for an injunction to prohibit the delivery to this company of the bonds voted to it by the town, on the ground that the lease of the road to the Chicago, Burlington & Quincy Company was a violation of the contract. A temporary injunction was granted.

Missisquoi Railroad.

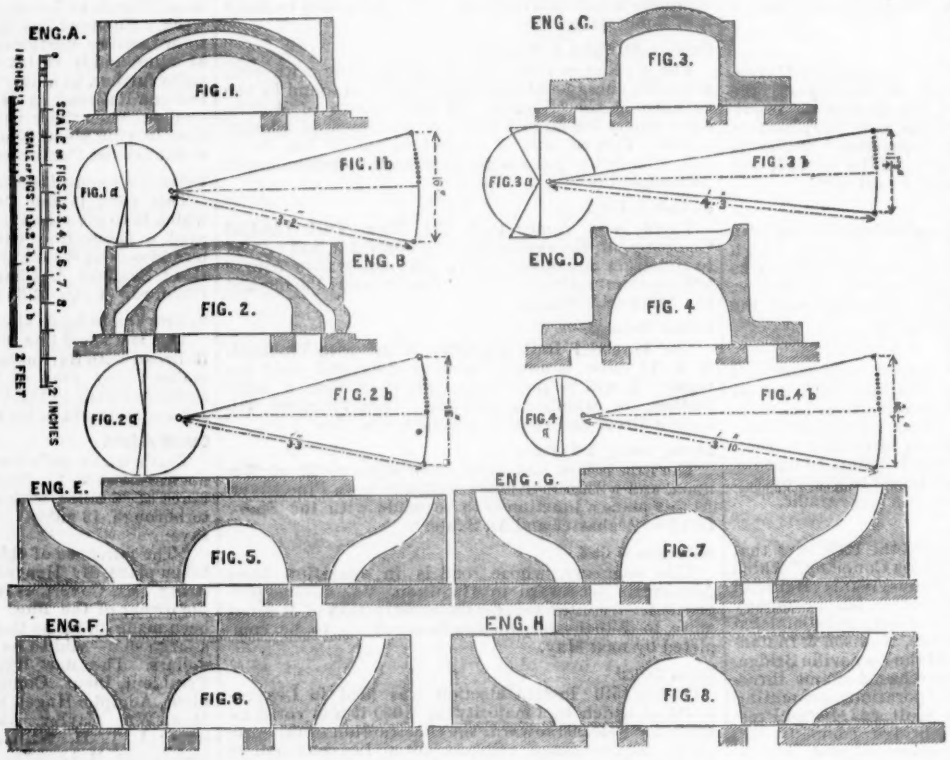
Track is laid on this railroad from St. Albans, Vt., eastward to Enosburgh Falls, about 20 miles. About ten miles more will complete it to its eastern terminus at Richford, where it will connect with the Missisquoi & Clyde River Railroad, now under construction from Richford eastward across Lake Memphramagog to a junction with the Connecticut & Passumpsic Rivers Railroad at the mouth of Clyde River. The new road is constructed as a feeder to the latter, which expects to use it as a link in a new line to Montreal.

Bauschinger's Indicator Experiments on Locomotives.

(Continued from page 218.)

II.—ON THE FORM OF THE INDICATOR.

In order that the indicator curves obtained from an engine may convey a correct idea of the action of the steam, it is necessary to construct, in the first place, the valve-motion diagrams, either geometrically or from a model, due regard being paid to the deviations arising from the obliquity of the connecting rod. We do not consider it indispensable that the valve-motion diagrams prepared by Herr Bauschinger should be reproduced here, but we shall, in the course of our examination of the indicator curves, refer to distribution cards obtained from those diagrams, by means of which the corresponding openings of the steam ports can easily be ascertained. We at present illustrate, in Figs. 1 to 4, the valves of the four engines with the shifting link motion, and in Figs 5 to 8 those of the other engines, which are fitted with Meyer's double valve motion, drawn to a scale of 3 inches to the foot. We also show figures giving the stroke of the eccentrics with the lead, and the proportion of the eccentric rods and expansion links belonging to the former engines. To complete the description of other parts affecting the action of the steam, Herr Bauschinger gives in his work a table containing the areas of the regulator openings, of the steam and exhaust pipes, of the ports, and of the blast-pipe orifices, and the capacities of the clearance spaces these including the contents of the pipes connecting the indicator with the cylinder ends. These data are contained in the annexed table (III).



Professor Bauschinger's collection of indicator diagrams is a very extensive one, the average number of double curves taken of each engine being not less than 61. Of this number the work under notice contains from 8 to 10 diagrams per engine, taken at various speeds, positions of the regulator, blast pipe and reversing lever (or expansion valves respectively.) For the purpose of criticism, however, we think it to be sufficient to reproduce only two different systems of valve motions, namely, the single valve and the double valve motions, reserving for cases of special interest the illustration of additional diagrams.

As will be noticed, the curves are drawn in pairs, as obtained from both cylinder ends respectively, representing the indicator curves half the original size. The left-hand curve in the diagram refers always to the hind, and the other curve to the front cylinder end and to the first double curve of each series is annexed, on the left-hand side, the scale for their ordinates in pounds per square inch. An annexed table of reference gives for each pair of curves the circumstances unde which they were taken, namely:

TABLE III.

CLASS OF ENGINE.	Regular opening in per cent. of cylinder area.	Main steam pipe area in per cent. of cylinder area.	Branch steam pipe area in per cent. of cylinder area.	Steam port area in per cent. of cylinder area.	Clearance space in per cent of cylinder capacity.	Exhaust pipe area in per cent of cylinder area.	Main exhaust pipe area in per cent. of cylinder area.	Blast orifice area in per cent. of cylinder area (open.)	Blast orifice area in per cent. of cylinder area (shut.)	Blast orifice area in per cent. of cylinder area
A	6 6	9.6	7.1	8.2	6.1	18.0	20.6	9 4		3.0
B	6 6	9.6	7.1	8.2	6.1	18 0	20.0	9.4		3.0
C	7.6	10 8	6.0	9.1	6 0	17.5	20.4	13.0		7.8
D	7.5	10.8	6 1	8.0	6.1	18.0	30.6	11.8		3.4
E	8 0	7 6	6.4	7.7	6 1	17.5	22.6	9.2		2.8
F	9.0	12 0	10 8	6.7	6 2	9.0	11 4	21 0		7.6
G	9 0	12 0	6 3	7.5	5.8	9 0	16.0	12 2		4.4
H	9 0	11 6	7 6	6 0	8.8	8.5	16.0	7.2		2.6

1. The speed the engine was traveling, expressed in revolutions of the driving-wheel per minute, as obtained with the stroke counter, and reduced, also, to feet per second of average piston speed.

2. The regulator opening. It should be observed, under this heading, that the opening of one-half was sufficient to admit the maximum quantity of steam, and that this amount should therefore be considered equivalent to "full open."

3. The blast-pipe opening, which can be modified within the limits indicated in table III.

4. The boiler pressure (BP.) being the average indication of the steam gauge for the minute during which the curve was taken.

5. The maximum cylinder pressure for both cylinder ends, expressed both in pounds per square inch and in percentage of boiler pressure.

6. The average effective cylinder pressure (PM.) obtained by circumscribing the curves with Amsler's planimeter.

The position of the reversing lever, or (as in the case of Meyer's motion) of the expansion indicator, is also given for each series of diagrams; in addition to this, the degree of admission, as shown by the valve motion diagram, is also inscribed besides the number of "notch"; and differing as it does for the two cylinder ends—on account of the obliquity of the connecting rod—this value is given for both ends, hind and front. In the curves themselves, the leading points of the steam distribution, as, beginning of admission, expansion, release, and compression, are distinctly marked.

The curves, appertaining to each degree of expansion, are in all cases preceded by an explanatory diagram, which, having been reduced from the full size valve-motion diagram—shows very clearly the action of the slide valve.—*Engineering.*

(TO BE CONTINUED.)

MECHANICS AND ENGINEERING.

Thornton's Dust Arrester.

The invention of Mr. W. M K. Thornton for keeping dust out of cars, described some time ago in the RAILROAD GAZETTE, has been applied to some cars on the Chicago & Alton Railroad where it has proved very effective. It consists, as may be remembered, of a light floor suspended under the cars within a few inches of the track.

New York Central Round House.

At Syracuse the New York Central & Hudson River Company is constructing a new round-house for twenty-three engines.

East Saginaw Shops.

At the shops of the Flint & Pere Marqette Railroad, in East Saginaw, Mich., two box cars are turned out daily. An addition of six stalls to the round-house will make it accommodate sixteen engines.

Stinard's Steam Brake.

The following description of this brake is given in the Whitestown (N. J.) *Herald:*

"Underneath the foot-board of the engine is a steam cylinder about eighteen inches long. There is a lever connected in the center with the piston, one end made stationary, and the other end connected with a rod running under the car to a sway-bar; one end of the sway-bar has a rod running to and connecting with the Miller buffer, by means of an equalizing lever. The center of the sway-bar being connected with a slide-bar that the hand-brake is connected to, the motion of the car is conveyed from the buffer to the sway-bar, giving an opposite motion to the main rod, so that when the train spreads in starting, the rod, moving in an opposite direction, keeps a taut rod under all the cars, while the slide-bar stands perfectly still where the hand-brake is connected. Each car is provided with the same apparatus. Thus the whole device, when the power is applied, adjusts itself so that every brake is put on with the same power at the same instant. Having no chain connections, the steam throws off the brake as easily as it puts it on. The rods running under each car are connected together when the cars are coupled by means of a single pin; thus making a continuous rod from the engine to the rear car of the train."

Canal-Boat Propulsion.

The Glens Falls (N. Y.) *Republican* gives the following description of a plan for applying steam to canal-boat propulsion, invented by Hon. K. P. Cool, of that place, who owns a fleet of canal boats engaged in the transportation of lime, which he manufactures, and who, therefore, has an interest in the success of the plan aside from the reward offered by the State. We learn that Mr. Cool's plan has been approved by experts, and that he is fitting a boat with machinery in order to make a practical test of it. The *Republican*, after speaking of the statement that there is a loss of at least 33 per cent. of the power in using paddle-wheels or screws, says:

"This invention promises to save the loss of power spoken of by wholly discarding the use of both paddle-wheel and screw. His plan is to have a suitable boiler, with pipes leading directly to the steam-chests of two cylinders, five feet long, and placed on each side of the keel in the stern of the boat. The piston-rods of the cylinders are to pass through a partition which forms a part of the groove or trough through which the paddles move. On the end or each piston-rod hangs a hinged paddle, which acts like a duck's foot—stationary one way and swinging back when returning. The paddles are so arranged as to move the boat back as well as forward. Each paddle blade is about 5 feet long and 16 or 18 inches wide, and as they move in a trough wholly within the hull of the boat, are completely protected from accident. The water set in motion by the paddles passes out at the stern of the boat in a straight line with the canal, and cannot injure its banks. As the paddles are moved by piston-rods five feet each stroke, and are placed within two inches of the bottom of the boat, where the water is unbroken by motion, the whole power of the engine is applied to forcing the boat ahead. By this application of power where there is so little machinery, the absence of friction adds much to the power of the engine and lessens the chances of getting out of order. One of the best features of this system of using steam power for propelling canal boats is the fact that boat builders offer to alter over or prepare any canal boat of 120 tons burden for one hundred dollars, and as the boiler and engine for towing two boats will not weigh over three tons, the whole expense of change from horse to steam power will be very light, and within the reach of most of the boat owners now doing the transportation business of the country."

Destructive Effect of Salt on Axles.

Of the recent reports of the inspecting officers of the Board of Trade upon the railway accident for the months of April and May, two refer to accidents occasioned by the fracture of the axles of salt wagons, one on the Great Eastern and the other on the Northeastern Railway. With regard to the latter accident, Col. Hutchinson, speaking of the broken axle, says that between the sound portion remaining and the outside of the fractured axle the surfaces were quite smooth, presenting the appearance of having been severed by a sharp instrument. This peculiar effect is possibly caused by the gradual action of the brine on the metal, the heat at the boss favoring the evolution of chlorine from the brine, and its then combining with the iron to form a soluble chloride of iron. From the position of the defect it was not discoverable by any ordinary inspection. Be the explanation of the peculiar destructive action which goes on in the axles of salt wagons what it may, there can be no doubt that the fact is a most serious one; on the Northeastern Railway alone, from February 8 to April 27 of this year, no less than seven axles of salt wagons having broken while running, and this out of a total number of about five hundred wagons, an enormously large proportion as compared with the fracture of wagons of any other description of rolling stock. So grave an aspect has the subject assumed, that the directors of the Northeastern Railway Company have given the Salt Company, to whom these wagons belong, notice that until they could obtain an assurance that better axles had been provided, they would decline to carry the wagons in question. The Great Eastern Company have, Colonel Hutchinson believes, acted in a somewhat similar manner; and if other companies were to adopt the same course, it would no doubt tend much to diminish the constant accidents arising from the breakage of the axles of salt wagons. Colonel Hutchinson thinks it would be desirable, in addition to requiring these wagons to be provided with well-constructed axles of good quality, to insist on the date of their commencing running being stamped upon the axles, and to lay down a reasonable number of years as a maximum for their being used. Colonel Hutchinson adds that he is not aware of any special difficulty connected with making salt-wagons water-tight; at any rate, such a construction should be aimed at, so as to diminish the leakage as much as possible.—*London Railway News.*

Hannibal Bridge.

The result of the partial test of the bridge on the 1st of August is given in the Hannibal *Courier* as follows: "Capt. Corthell, Chas. H. Thacher, and Mr. Clark had been selected as engineers to take the deflections of the bridge from the eastern shore. They located their instruments at a point about fifty feet from the east end of the bridge, and on the south side of the approach, from which point they observed the deflection on span six, first with the engine alone, and then with four cars of iron attached. The deflection was as follows:

With load (120 tons)	1st qr.	deflection	⅞ of an inch.
" " "	center	"	1¼ inches.
" " "	4th qr	"	⅞ of an inch.
Elongation while on the 4th quarter			3-16 of an inch.

Des Moines & Winterset.

This company has contracted with the Chicago, Rock Island & Pacific Railroad to iron its road.